

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—13TH YEAR.

SYDNEY: SATURDAY, FEBRUARY 13, 1926.

No. 7.

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PROTEIN THERAPY IN AFFECTIONS OF THE EYE.¹

By HERBERT F. SHORNEY, M.D., F.R.C.S. (Eng.),
Honorary Ophthalmic Surgeon, Adelaide
Hospital, Adelaide.

THE use of proteins in the treatment of eye diseases covers the period from 1915, when Schmidt introduced the injection of cow's milk. Previously to that Rumph had used *Bacillus pyocyaneus* vaccine in the treatment of typhoid fever. Gelbert in 1894 suggested the treatment of pleurisy by means of the subcutaneous injection of the pleural exudate (? fluid). Darier in France was also an advocate of this paraspecific serum treatment. The leucocytic action of diphtheria antitoxin is well known. The results of the use of normal horse serum in cases of hæmorrhage resulted in the patient's own serum being tried. In 1894 Eckert demonstrated that injected or transfused blood acted, not as replaced blood, but as a chemical stimulant.

Injected blood cells call forth both a local and a general reaction, a local and general leucocytosis, which reaches its highest point from eight to twenty-four hours after the injection. The following is a

résumé of the literature on the use of patient's own blood or serum in ophthalmic practice.

In 1911 Röhmer used it in cases of keratitis iritis and gonorrhœal conjunctivitis. In 1921 Gonzales used blood serum injections in cases of recurrent bleedings in the vitreous when the blood showed deficient coagulative power. In 1923 Perles used blood drawn direct from the patient or serum from a blister raised by *emplastrum cantharidis*. The doses were one to two cubic centimetres repeated subconjunctivally nine to ten times. The conditions treated comprised mostly ulcer of the cornea and uveitis from some external focus. Drouet used similar treatment in similar conditions, giving larger doses (five to twenty cubic centimetres) for five to six injections. Diaz treated peridacryocystitic inflammations, *ulcus serpens*, post-operative injections and gonorrhœal iritis with two to three cubic centimetres of blood, giving two to ten injections with excellent results, except in panophthalmitis.

Liesko⁽¹⁾ recommends blood serum or blood injections in acute serous iritis, hæmorrhagic iritis, acute and chronic cyclitis, uveitis and beginning irido-chorioiditis.

¹ Read at a meeting of the South Australian Branch of the British Medical Association on October 29, 1925.

Again we have that class of metallic elements combined with albumins such as silver, mercury, manganese, tin, sulphur *et cetera*, also the vaccine treatment associated with the name of Sir Almroth Wright.

Gonorrhœal Ophthalmia.

The principal substance with which I shall deal in these remarks is cow's milk and its most important applications are in the treatment of gonorrhœal ophthalmia in the infant and adult.

The technique for making the injection in ophthalmic practice is given below.

In regard to dosage, a new-born infant receives two cubic centimetres, a child six years of age receives five cubic centimetres, a child eight to ten years of age eight cubic centimetres and a child over ten years of age ten cubic centimetres. Adults may be given fifteen cubic centimetres if the dose be repeated in severe cases.

Bring the milk to boiling point and allow it to boil from four to five minutes only. The albumin would be coagulated and changed and the resulting reaction minimized or negated if the boiling were longer continued. This boiling is done because abscess resulted from non-sterilization of the fluid. About five to eight hours later the reaction occurs with a rise of temperature up to 38.3° to 38.9° C. (101° to 102° F.). In one of my patients the temperature rose to 40° C. (104° F.). At times there is also an inclination to shiver with a feeling of nausea. The injection is made deeply into the gluteal region with at least a five centimetre (two inch) needle and with usual antiseptic precautions. If no good reaction be obtained give ten to fifteen cubic centimetres next day. No injection is given on the third day. If necessary ten to fifteen cubic centimetres are given on the fourth day and ten to fifteen cubic centimetres on the fifth day. It is not often necessary to give the whole series, except in severe gonorrhœal cases.

Perforating Wounds of the Globe.

In perforating wounds of the globe the use of milk injections has been of great efficacy. Almost every perforating injury of the eye is a potential cause of sympathetic ophthalmia. By the routine use of this reagent in all cases we can almost dismiss this possibility from our minds. In support of this one may state that in a large Continental clinic no case of sympathetic ophthalmia has been observed for two years since this line of treatment has been followed. A short account of a case of injury will illustrate this.

A patient was admitted to the Ophthalmic Ward of the Adelaide Hospital suffering from perforating wounds of both globes, involving the ciliary region and adjacent vitreous area. These wounds were caused by the brass fragments of an exploded gelignite cap. The wounds were clean cut in the sclera and from five to six millimetres in length. A brass fragment was removed from one eye and one was found in the other eyelid and this eye afterwards was found to contain no foreign body when examined by X rays. The patient had a milk injection. The eyes remained quiet. A large hyphæmia on one side soon disappeared, the iris remained quiet and there was hardly any secretion. One wound was sutured, the other, a foreign

body being suspected, was left open. This wound soon closed up. Later on all that could be seen by the ophthalmoscope was a small string-like vitreous opacity and a very small detachment over the site of penetration on one side.

It is well known that fragments of copper or brass are very much more likely to cause suppuration if they penetrate the globe than pieces of iron or steel.

Affections of the Iris, Ciliary Body *et cetera*.

Acute inflammations of any part of the uveal tract give excellent results after this treatment. For example in iritis we see that: (i.) The anterior chamber becomes clear; (ii.) the pupil dilates; (iii.) small exudates in the pupillary area are absorbed; (iv.) the iris pattern becomes clear, showing that the serous and fibrinous exudates between the iris trabeculæ have been absorbed; (v.) pain is relieved.

Opinion seems to be divided as to the benefit derived from this treatment in chronic cases of iridocyclitis *et cetera*.

Wound Infection After Cataract Extraction.

A milk injection given early in wound infection after cataract extraction may avert a panophthalmitis.

It may not be out of place here to sound a note of warning not to give an injection as a prophylactic measure after every cataract operation in order to anticipate infection. This has been found not to be advisable as the resulting reaction is not good for elderly people. It pulls down the general condition of the patient and this may favour the development of some intercurrent affection in an elderly person closely confined to bed in the recumbent position.

As a result of the giving of milk injections manufacturing chemists have put on the market various stable substances to replace milk. These substances are much more expensive and have not apparently given any better results than cow's milk. A few examples are given here.

Pillat⁽²⁾ gives his experiences with "Aolon," "Kaseosan" and "Arthigon" in gonorrhœal ophthalmia. He found that these substances had very little power.

One of his case histories is here quoted.

A girl, nineteen years of age, had suffered for three days from gonorrhœal conjunctivitis. Great swelling of upper lid and its conjunctiva and chemosis of the bulbar conjunctiva were present with hæmorrhages and much discharge. On May 12 an "Aolon" injection was given. On May 13 the "Aolon" injection was repeated. On May 15 no improvement had occurred. As it was now feared that the cornea might become involved ten cubic centimetres of milk were given. On May 17 ten cubic centimetres of milk were given and this dose was repeated on May 18. On May 19 secretion had almost disappeared and the swelling of lid and conjunctiva was slight. On May 21 no pus was seen, but slight catarrhal discharge and papillary hypertrophy were present. The patient was now treated with alum stick. She was free of gonococci one week after the first milk injection.

Vancea⁽³⁾ has treated cases of keratoconjunctivitis (eczematous type) with intramuscular injections of "Gadil." This is a stable preparation of cod liver oil with the addition of lecithin and iodine. He gave ten to fifteen injections (one every second day) with good results.

Honti describes his experiences with three new preparations—"Novoprotein" (used intravenously), "Omnaden" (subcutaneously) and "Phlogetan" (intramuscularly). The results were not as good as those obtained with milk.

Huber used typhoid vaccine and milk injections as adjuvants to "Neosalvarsan" and bismuth "Salvarsan" in the treatment of interstitial keratitis.

Typhoid vaccine has been used as a substitute for milk. It has been found to be less efficacious and the violent headache accompanying its action makes patients very unwilling to have a second treatment.

Angellucci⁽⁴⁾ used one to three cubic centimetre injections of patient's own serum in the treatment of trachoma (it is not said whether cases were acute or chronic) and obtained a quick healing of the trachomatous condition.

Hessburg examined the eyes of patients with *lues cerebri*, *tabes dorsalis* and general paralyses of the insane. He found no alteration in the eye conditions of these patients either for better or worse as a result of the quotidian malarial treatment.

Oil of turpentine has also been tried, but its use has been given up, as it causes a necrosis abscess at the site of injection.

Miloslawskoja⁽⁵⁾ recommends milk injections, especially in inflammations of the uveal tract. He also states that they have a favourable influence on tuberculous affections of this region.

Dorf⁽⁶⁾ has had good results in severe "scrofulous" affections of the eye by the use of the same fluid. Our own cases comprise the following: Simple iritis, nine cases; iritis complicating hæmastic cataract, three cases; perforating wounds, three cases; gonorrhœal ophthalmia, one case in one infant with perforation of both corneæ when seen. We have also used this treatment in a number of cases of iritis following cataract extraction. From the results in these patients we have been satisfied with the beneficial effect of the treatment, but the prime reason for these notes is to urge that the treatment be tried in all cases of gonorrhœal ophthalmia. Our reasons for this are: (i.) It is easily obtained; (ii.) it gives results better than any manufactured substitute; (iii.) it is a bland, non-irritant fluid; (iv.) anaphylaxis is almost unknown, though Jœgcs quotes two instances of its occurrence; it must be very rare.

Very occasionally no result is obtained by giving milk injection, but this can be said of any remedy. Moreover, old people stand this treatment better than children.

It is quite unlikely that any harm can come from the use of milk injections; they are well worth trying, when one realizes that their use may mean the preservation of the patient's vision.

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- (2) Pillat: *Ibidem* July, 1925.
- (3) P. Vancea: *Clujal Medici*, Numbers 9 and 10, 1924 (Roumania).

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NERVE ENDINGS IN ADIPOSE TISSUE.

By H. J. WILKINSON, B.A. (Adelaide), M.B., Ch.M. (Sydney),

Lecturer in Anatomy, University of Sydney.

AND

A. N. BURKITT, M.B., B.Sc.,

Professor of Anatomy, University of Sydney.

DURING the progress of a survey of the nerve endings in mammals it was noticed by one of us (H.J.W.) that in specimens of adipose tissue taken from the rabbit, branches of fine, naked varicose nerve fibres could be traced to minute terminations apparently in relation to fat cells and it was suggested that they might have some regulatory effect upon them. The actual localities in which these endings have so far been observed are (a) fat cells from near the capsule of the knee joint and (b), fat cells from the orbit.

Technique.

The tissues were prepared by the ordinary injection method of *intra vitam* staining with methylene blue (Grubler nach Ehrlich, 0.5% normal saline solution), as described by Wilson.⁽¹⁾ The tissues were fixed in a saturated solution of ammonium picrate, preserved in equal parts of the picrate fixative and glycerine and finally mounted in Apathy's gum syrup.

Description of the Nerve Endings.

The first observation was made during the course of an investigation of the nerve endings in synovial membrane. A piece of the capsule on the lateral aspect of the knee was snipped off and examined. Besides the nerves seen in relation to the membrane and to the blood vessels, other fine, naked varicose nerve fibres were observed to track through groups of fat cells. These were followed and were found to give off small branches which apparently terminated in relation to fat cells and moreover, in some cases the fibre itself could be traced to a similar termination (see Figures I and II.).

Fat near Synovial Membrane.

In Figure I. the outlines of two fat cells are indicated and a nerve fibre is seen passing across them. This fibre was traced from a distance and has the typical varicose appearance of nerve fibres. There could be no question as to its being a nerve fibre as apart from its appearance it could be traced to a definite nerve bundle. Furthermore, ordinary connective tissue fibres could be distinguished, being unstained and of uniform thickness. This fibre will be seen to terminate on the fat cells either in (a) fine granular knobs stained uniformly blue or in (b) small beads with a relatively paler centre, somewhat similar to those seen in the course of the nerve fibres. At or near the junction of the two fat

cells small branches (c) are to be seen ending in plain fibrils. These latter may really be similar to the endings (a) or (b), the terminal bead or granule having failed to take the stain.

In Figure II. two nerve fibres will be seen passing across the field from left to right. These came from a group of parallel fibres running vertically across the field immediately to the left of the fat cells which are figured. The first fibre (I.) ended in one branch with a terminal bead against one fat cell (a) and a second branch which ended in relation to a series of granules on the other side of another fat cell (b). The second fibre (II.) divided and its branches could be traced for a considerable distance from this field. Each of these branches gave off a short terminal twig, the one (c) ending in a fine bead and the other (d) being really double and ending in the one case in a bead and in the other case in a fine network, both being in close association with the surface of a fat cell.

Extracapsular Fat near Knee Joint.

As there was a possibility that the nerve fibres and endings described in Figures I. and II. were simply synovial membrane endings mechanically included in the fat owing to the method of preparation of the specimen, a second piece of fatty connective tissue from the same knee joint specimen, which was definitely extracapsular, was next mounted and examined. Figure III. was drawn from a field observed in this specimen. In it a nerve is seen passing across the surface of some fat cells and then crossing a small blood vessel with contractile muscle cells. The fibre terminates in a number of fine branches which end in relation to the fat cells. The terminations are mostly granular in nature. One fine branch appears to end in relation to granules near the nucleus. It may be noticed that this fibre is running through the adipose tissue without any relation to a vessel. The nerve fibre seen on the left of the figure is definitely related to the vessel figured and can be traced for a considerable distance.

Adipose Tissue in the Orbit.

The above observations led us to examine preparations of adipose tissue in other regions. Therefore another rabbit was injected and fatty tissue from the orbit was examined. A field from this preparation is shown in Figure IV. Here a rich network of fibres is shown on the surface of a fat cell. The nerve fibres give off branches which terminate in bead-like endings or fine granules or in fine fibrils. These terminations are similar to those seen in the previous figures. In this figure the fine fibrils (C₁ and C₂) seemed to merge into the perinuclear cytoplasm, though in the case of fibrils (C₃) the ending was on the side of the cell opposite to the nucleus.

Discussion.

Our observations, so far, are limited to the above preparations, but endeavours have been made to discover similar endings in fatty tissue in other regions of the body, not only in the rabbit, but in

the mouse and in man, both the methylene blue and the Bielschowsky technique being used. Up to the present our endeavours have not been successful, but we have seen indications of similar nerves, though they were not so definite. We ascribe this failure to confirm our observation definitely to the fact that in the one case the nerves seen had not taken up the methylene blue so sharply and in the other with the Bielschowsky technique the fine nerves could not be easily differentiated. Dogiel, however, states in describing his methylene blue technique, that fatty tissue should be carefully dissected away before applying the stain, presumably because he thought that it interfered with the staining. We think, therefore, that the importance of the observations described above was sufficient to outweigh any negative evidence we have, hence we thought it necessary to record them in a preliminary account.

As far as we are aware, no nerve fibres have previously been described as ending in relation to fat cells. The question immediately arises as to what relationship exists between these fibres we have observed and the fat cells. At least two interpretations are possible: (i.) That these nerve fibres have a definite "trophic" or "regulatory" influence upon the fat cells; (ii.) that they are merely sensory fibres to connective tissue, some of whose cells have developed into fat cells which are mechanically pressed up against these endings. Some observers have seen free terminations of nerve fibres in connective tissue, more especially in muscle sheaths, for example Kulchitsky⁽²⁾ *inter alia* so that the second interpretation is possible. But Schafer⁽³⁾ says: "No sensory nerves seem to terminate in this (meaning adipose) tissue, although its blood vessels receive nerve fibres and also nerves destined for other textures pass through it. Accordingly, it has been observed that, unless when such traversing nervous twigs happen to be encountered, a puncturing instrument may be carried through the adipose tissue without occasioning pain."

As regards the first hypothesis a certain amount of experimental and clinical evidence has accumulated which lends it support.

Experimental.

Camus and Roussy⁽⁴⁾ have recently shown that injury to the *tuber cinereum* region of the third ventricle leads to extensive fat accumulation throughout the body and it was seen on histological examination that there was injury to the hypophysis. These experiments would seem to indicate some central control of fat metabolism, apart from endocrine and humoral influences. This experimental work has been confirmed by Evans and Smith in California (personal communication).

Clinical.

The well known lipo-dystrophies, whether localized or general, are difficult to explain as being purely due to disturbances of the endocrine organs. Further evidence as to the possibility of such regulatory nerves is given by analogy. Nerve fibres are present in blood vessels, in kidney tubules and in

ILLUSTRATIONS TO THE ARTICLE BY DR. WILKINSON AND PROFESSOR BURKITT.

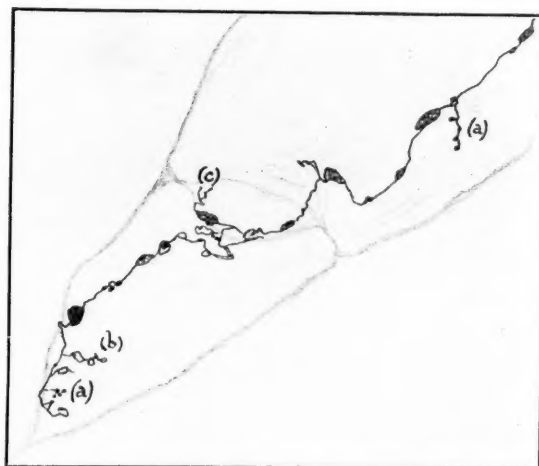


FIGURE I.
Nerve fibres ending in relation to two fat cells beneath the synovial membrane from the knee joint of the rabbit.

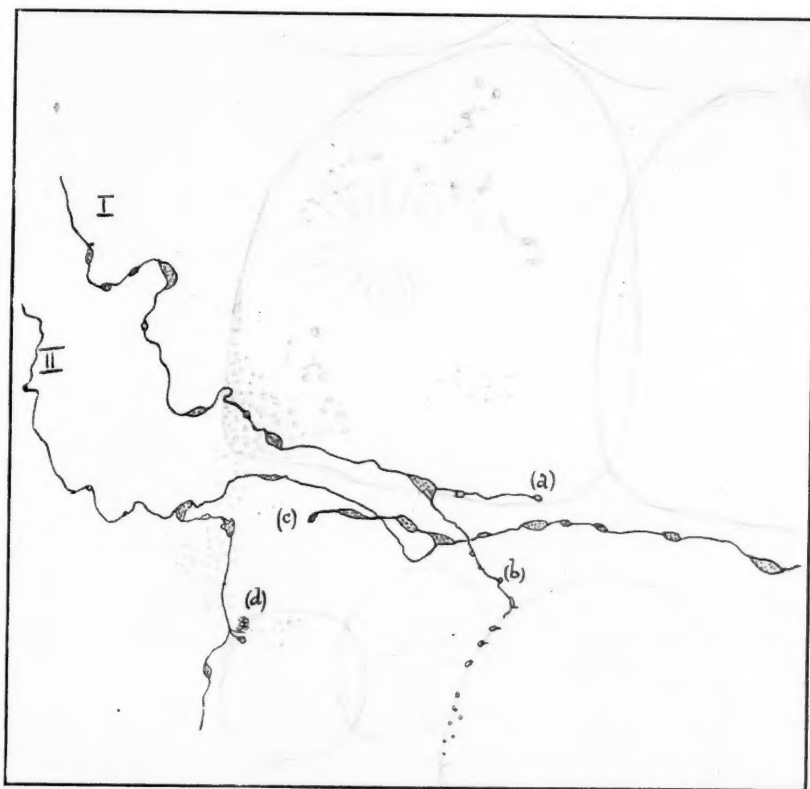


FIGURE II.
Another preparation from the same specimen as Figure I.

ILLUSTRATIONS TO THE ARTICLE BY DR. WILKINSON AND PROFESSOR BURKITT.

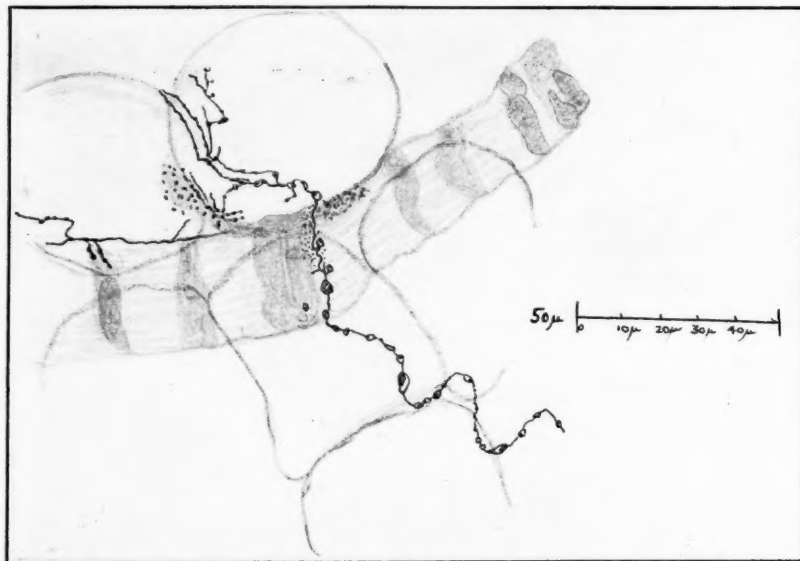


FIGURE III.

Nerve fibre in relation to fat cells situated outside the capsule of the knee joint. One branch apparently ends in relation to granules near the nucleus. The fibre on the left is in relation to the small blood vessel.

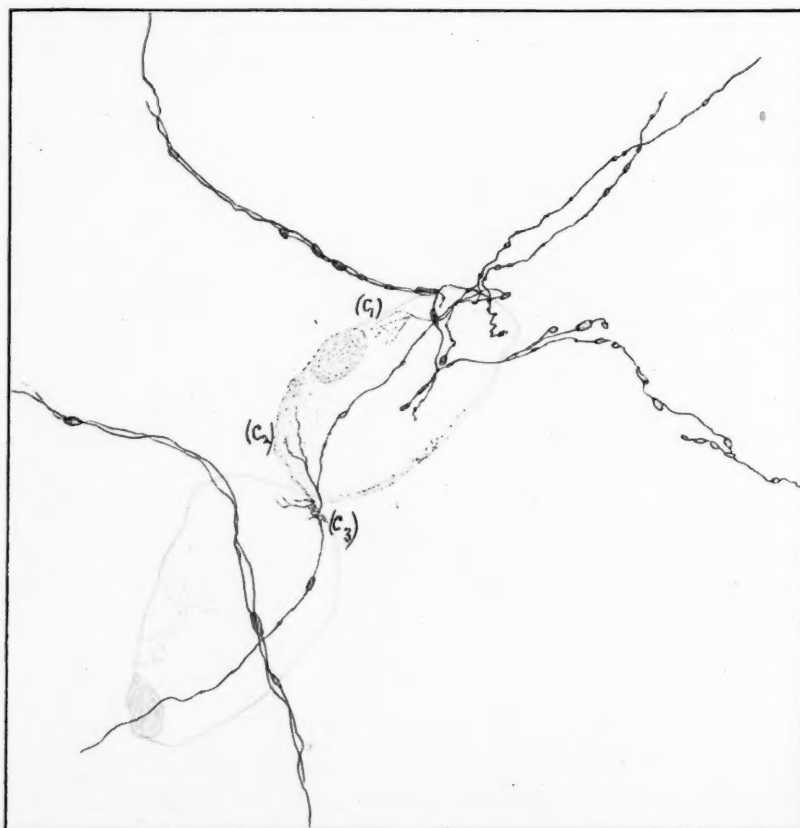


FIGURE IV.

Nerve fibres in relation to fat cells in orbital tissue.

certain connective tissues. Further the function of the fine networks to be found in relation to the serous and synovial membranes has by no means been fully elucidated. All of these structures are mesodermal in origin. Again the pigment cells of fish and amphibia among the lower vertebrates have been shown⁽⁵⁾ to have an elaborate nerve network which is probably regulatory in function. Pawlow and Orbeli⁽⁶⁾ and their collaborators further appear to champion the cause of regulator or trophic nerves to various organs and tissues. Finally the autonomic innervation of ectodermal and endodermal gland cells throughout the body has long been accepted and the nerve fibres definitely traced to individual cells.

Summary.

1. Fine nerve endings from non-medullated nerve fibres, presumably sympathetic, have been traced to the surface of fat cells in two regions of the body of the rabbit.

2. We suggest that these may have some regulatory influence upon the activity of the fat cells.

We are still engaged in search for further evidence of the existence of nerve endings in fat and experimental work the results of which are not yet available, is also being carried out to determine whether sympathetic nerves have any direct relation to fat metabolism.

Note.

While the above was going through the press, we found in the *Revue Générale d'Histologie*, Fascicule,⁽⁷⁾ which had just arrived from Paris, a reference to previous work by A. Sfameni, published in 1902, upon the innervation of fat. This work had apparently remained unnoticed by subsequent observers. Sfameni in an account of nerves in adipose tissue, periosteum, perichondrium and the supporting tissues of joints describes and figures nerves to fat found in the interior of the knee joint in the dog. After drawing attention to the technical difficulties of staining nerve fibres in fat, he says he was successful only in the case of fat from the knee joint and when using the gold chloride method of Ruffini. He figures medullated fibres ending in tufts among the fat cells. He was unable to stain nerve endings and fat cells at the same time and only in one case could he demonstrate the probable relation of the ending to the fat cells. He also saw non-medullated fibres, but he does not state where these ended, he merely states that they either accompanied the medullated nerve fibres or the arteries and the capillaries. He also found corpuscle-like endings. These corpuscles and the non-medullated fibres, he suggests, are both sensory in nature. It will be seen that there is some discrepancy between our observations, which are more extensive, and those of Sfameni. In either case it is clear, however, that nerve endings may be found in relation to fat cells in and around the knee joint and further we have found them in orbital fat, while it is probable that only technical difficulties have precluded the observations of the endings on fat cells throughout the body. Sfameni clearly

realized the possible regulatory influence of these endings, but apparently never extended his observations.

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- ⁽³⁾ E. A. Schafer: "Textbook of Microscopic Anatomy," page 128.
- ⁽⁴⁾ J. Camus and G. Roussy: "Les fonctions attribuées à l'hypophyse," *Journal de Physiologie et de Pathologie Générale*, 1922, Volume XX., page 509.
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- ⁽⁷⁾ A. Sfameni: "Recherches anatomiques sur l'existence des Nerfs et sur leur Mode de se Terminer dans le Tissu adipeux, dans le Perioste, dans le Périchondre et dans les Tissus qui Renforcent les Articulations," *Archives Italiennes de Biologie*, 1902, Tome XXXVIII., page 49.

OVARIAN MALIGNANCY WITH SPECIAL REFERENCE TO KRUKENBERG TUMOURS.

By R. F. MATTERS, M.B., Ch.M., F.R.C.S. (Edinburgh),
D.G.O. (Vienna),
Adelaide.

MALIGNANT tumours of the ovary may be divided into the two groups: (i.) carcinomata, (ii.) sarcomata. These tumours are peculiar in that while the former are more frequently secondary to carcinomata elsewhere, the latter are usually primary.

Carcinomata like sarcomata may be primary or secondary and the primary carcinomata usually arise by metaplasia from some benign cystic condition of the ovary and the malignant tumour is itself cystic. Solid or pseudocystic carcinomata are usually secondary. The fact that in a series of thirty-two cases in the Kaumauner Klinik, Vienna, twenty-nine were definitely secondary indicates that the bulk of these tumours are secondary. The remaining three primary tumours were unilateral.

Sarcomata on the other hand are more frequently primary than secondary and even though I am unable to quote figures, nevertheless it seems that the majority of ovarian sarcomata are unilateral and primary, usually from degeneration of some benign tumour to a malignant condition.

Cases of carcinoma have been recorded in which the malignancy is both primary and bilateral, but upon closer examination it is usually found that one ovary is much larger than the other and after weighing the macroscopical and microscopical evidence the conclusion is that the lesion in the small ovary is secondary to that of the larger ovary.

Carcinomata are the tumours towards which attention is especially directed here and these may be divided into their groups of cystic or solid tumours. Cystic carcinomata are usually primary in the ovary and supervene upon some benign cystic

condition either the multilocular pseudomucinous cystoma or the potentially malignant papilliferous cystoma.

Corpus luteum or *theca luteum* cysts do not show malignancy in the ordinary way, but a peculiar condition sometimes develops, the cysts become multiple and in some cases large luteal cells may be found invading normal ovarian tissue and I have seen several of these cases associated with chorion epithelioma. Moreover, cases of hydatidiform mole have been described in association with this ovarian condition. Apparently this is due to the disorganized luteal influence upon the decidua and through the decidua upon the chorionic villi. This then appears to be the influence productive of the chorionic type of malignant disease.

Dermoid cysts as such do not become malignant, although their teratomatous nature makes them eligible for any type of malignant disease. The cyst itself, however, being derived from the ectoderm, has been known to develop an epitheliomatous growth from the mamilla and this is the only true primary epithelioma which may develop in the ovary.

Investigators have stated that the junctional tubules of the ovary have been known to develop adenocarcinomata by malignant changes occurring in the columnar epithelial cells and the types are diffuse celled and solid alveolar carcinomata.

Peritheliomata and endotheliomata may originate from the perithelium or endothelium of the vessels. These malignant types are considered by Bland Sutton to be sarcomatous, while Lockyer and Shaw regard them as carcinomatous.

There is a type of carcinoma which has recently been described and which is more common than is generally supposed. This is the tumour which was once called the *fibrosarcoma cellulare carcinomatodes* and which now bears the name of the Krukenberg tumour.

Before describing this tumour it might be well to note that Sampson Handley, of the Middlesex Hospital, stated that in his opinion the ovary was a very receptive medium for invasion of malignant cells and that he considered that many cancer cells falling into the abdominal cavity of a female were liable to produce metastatic growths in the ovaries more than in the other tissues of the lower abdomen. He instanced several cases in which a primary cancer of the breast has had secondary deposits in the ovary due to the cancer cells travelling by "permeation" through the fascial planes to the epigastrium and there entering the abdominal cavity.

The Krukenberg tumour has been shown by Erdheim and Schiller to be a pure carcinoma and always secondary to carcinoma of the gastrointestinal tract or of the gall bladder. The cancer cells from these parts are said to fall on to the ovary and to become implanted there, but, being secreting cells, these cells continue to produce the secretion and to become distended, as there is no gland lumen into which to pour the secretion. These cells are not closely packed together, but invade

either in small groups or in a diffuse form and they are surrounded by the ovarian connective tissue.

The distension of the cell by its own secretion produces a globular shape and the nucleus is pushed to one side and flattened against the cell membrane, so that in a well stained slide the appearance is typical and the cells resemble signet rings and Krukenberg once called it the "signet ring tumour." The distension of these cells has a pronounced irritative effect upon the connective tissue and so stimulates it that it has the appearance of a fibrosarcoma, whence the old name was derived.

Several well stained slides in my possession show these points rather well, especially the "signet ring" cells. In one slide these are observed to be invading in groups and in another slide are seen to be invading individually.

Macroscopically these Krukenberg tumours are smooth, the surface is bossed and the whole ovary appears to have undergone enlargement. The tumours feel rather sponge-like and not so much of a cystic sensation exists, although the sensation of elasticity is present.

The origin of the primary tumour varies, but in a series of five cases the primary condition was found twice in the gall bladder and three times in the pylorus and pyloric antrum.

In view of these findings it seems necessary to regard the ovary as a possible site for metastases in many cases of abdominal malignant disease and this organ should always be suspected in these cases. Bonney, of London, states that the ovaries in many of his Wertheim operations appeared macroscopically unaffected by the cancer cells, but on microscopical investigation cancer cells have been found in a very large number of cases. Bonney also points out that this occurs "where there is no reason for suspicion from the lymphatic channels if regarded anatomically." Possibly the ovarian vessels in these cases may cause the metastasis or possibly the distribution occurs by "permeation."

The conclusion is that cancer cells find in the ovary a suitable medium for multiplication so that it is essential before considering an ovarian carcinoma as primary to eliminate the possibility of the tumour being secondary to any uterine, abdominal or breast carcinoma.

LAST SEASON'S GASTRO-ENTERITIS.

By E. H. M. STEPHEN, M.B., Ch.M. (Sydney),
Honorary Physician, Royal Alexandra Hospital for
Children, Sydney.

I HAVE framed a report on the cases of gastro-enteritis treated in "The Shelters" Ward of the Royal Alexandra Hospital for Children from the beginning of October, 1924, to March 31, 1925. I think some points may prove of general interest and I have added a few details of the methods of treatment adopted.

Our patients are treated in small two-bed cubicles of which there are eleven. Each "shelter" is entirely detached from its neighbours and the patients are grouped according to the variety of the infection and the severity of the attack.

The Hospital was fortunate in having a sister in charge who for several consecutive years has administered this ward and whose experience and enthusiasm were of great advantage in the treatment of this complaint. Two experienced resident medical officers attended the patients in succession and one honorary physician has charge of all the patients for the season. Excluding patients who died within twenty-four hours of admission to hospital, the death rate was 15% as compared with 16% for the preceding season.

Types of Infection.

The Flexner bacillus was isolated in forty-five cases. There was a death rate of 30% in this group.

The Shiga bacillus was isolated in six cases. The death rate in the group was 17%.

Non-lactose-fermenting organisms were isolated in twenty-nine cases. The death rate in this group was 17%.

Non-pathogenic organisms were isolated in one hundred and ninety-five cases. The death rate in this group was 27%.

Mortality Percentage.

Ten entirely breast fed infants were admitted, of which one died.

Of ninety-two patients over twelve months in age thirteen died.

Of one hundred and eighty-three under twelve months in age fifty-nine died.

Treatment.

Antidysenteric serum administered intramuscularly or intraperitoneally was freely used in a

great number and in early cases gave great assistance. In mild cases and those with no blood in the motions it was withheld.

In dehydrated subjects and patients with intractable vomiting normal saline solution injections of about one hundred and eighty cubic centimetres (six ounces) with 5% glucose were given intraperitoneally. Of sixty-nine of such patients all of whom were gravely ill, twenty-four recovered.

In eight cases citrated paternal blood was transfused intraperitoneally. All were caused by severe infections and three patients made a good recovery. In connexion with this remedy we found it of remarkable value in the treatment of several marasmic infants, who made no progress towards recovery, though they had survived the acute stages of gastro-enteritis. After intraperitoneal transfusion they made rapid strides and left the hospital in excellent health. I cannot exaggerate their dramatic improvement.

The influence of excessively hot weather on our patients was an immediate rise in the death rate. Bronchopneumonia frequently complicated the original disease and assisted a fatal termination.

These figures give a depressing aspect to the subject of gastro-enteritis, but it must be remembered that hospitals rarely receive other than patients suffering

from severe forms and seldom patients in an early stage of the disease. The fact that twenty-six children died within twenty-four hours of admission supports this claim.

As regards drug treatment salines such as sulphate of soda (one gramme or fifteen grains every four hours to patients six to twelve months old) or carbonate of magnesia (1-3



FIGURE I.

Shelter Ward at Royal Alexandra Hospital for Children.



FIGURE II.

Shelter Ward at Royal Alexandra Hospital for Children.

grammes or twenty grains to patients under six months) appeared to do good. A series of small doses of calomel followed in a day or two by *hydragryrum cum creta* with or without *pulvis ipecacuanhae compositus*, proved also of value. Bismuth was used in the later stages of the disease.

One must place on record the invaluable aid of hypodermic injections of morphine in cases of persistent restlessness. Very small doses, such as 0.0006 gramme (one hundredth of a grain) for patients of six months or 0.03 mil (half a minim) of tincture of opium repeated four hourly proved effective.

Of other remedies mustard baths and packs to combat collapse were used. Irrigation of the bowel with normal saline solution was carried out while there was much mucus in the stools.

Vomiting and abdominal distensions were often most resistant to treatment. For the former, gastric lavage with sodium bicarbonate solution was the most effective. Sips of this solution were given to collapsed patients.

To relieve distension saline enemata or the passage of a rectal tube accompanied in each case with a hypodermic injection of half a cubic centimetre of pituitrin was our chief help.

The occurrence of pyelitis proved a fairly frequent complication of the later stages. "Chloretone" occasionally relieved vomiting and restlessness (0.06 gramme or one grain for patients of six months).

Brandy had its usual duties to fulfil.

We did not gain noteworthy assistance from the use of "Dimol" or minute doses of *oleum ricini* in our cases.

A diet of whey or albumin water (usually the former) increased to whey and Benger's Food, then strengthened with teaspoonful doses of condensed milk, until eventually milk foods could be digested, was our usual regimen.

The patients were considered fit for discharge and signed up as "cured" when the motions were no longer frequent, yellow in colour and pasty in consistence and when the patient was found to be gaining in weight.

This disease requires unremitting attention and the patients received this from both resident medical and nursing staffs and the "voluntary aids." The "voluntary aids" are ladies who devote certain days each week to assist in giving these infants special nursing and "perambulation" which aid in stimulating convalescence to a remarkable degree.

The accompanying illustrations show the shelters used at the Royal Alexandra Hospital.

MEDICAL BENEFITS AND NATIONAL INSURANCE.¹

By J. NEWMAN MORRIS,

Chairman of Committees, Victorian Branch of the British Medical Association.

NATIONAL INSURANCE or national health insurance is the policy of organized society to furnish protection against life's hazards to that part of the

population which needs it. The hazards against which protection is needed, are sickness, accident, invalidity, normal and premature old age and unemployment. The objects of insurance are economic and hygienic: to maintain the working efficiency of the worker as a producer for the nation and as a breadwinner for himself and family, to provide means of maintenance whilst he is incapacitated or unemployed and facilities to aid his recovery when ill or injured. For these purposes compulsory State aided insurance is proposed to be established in the Commonwealth.

If this step is considered necessary by Parliament and people, it remains to consider the best method for its application.

In the various schemes of compulsory social insurance which have been in operation in European countries and in Great Britain for the past forty years, cash benefits and medical benefits have been in use to provide for the needs of the insured population.

On the whole beneficial results are claimed as the result of their operation and any attempt at the repeal of *National Insurance Acts* would be unsuccessful.

The method of providing cash and medical benefits appears to be the most direct, easy and obvious way of commencing the system and is common to all known schemes. It was adopted in spite of storms of criticism and has maintained its existence in spite of continued criticism. But there are very grave defects and omissions which have become more and more apparent as time has gone on, and these defects and omissions must be considered very carefully.

The Representative Body of the British Medical Association in Great Britain in 1922 decided by resolution that the measure of success which has attended the experiment of providing medical benefit under the *National Insurance Acts* system, has been sufficient to justify the profession in uniting to insure the continuance and improvement of an insurance system.

As approving an experiment this is quite satisfactory, but as a complete tribute it is lukewarm and gives an indication of the need for amendments and additions to the system.

Little is heard at the present time of objections to national insurance *per se*. It has been said that in spite of national insurance poverty remains and relief funds grow, that it encourages professional mendicants, demoralizing the entire working class by furnishing an easy reward for malingering, that the protection granted by national insurance destroys the sense of watchfulness and independence of spirit of the working class and actually increases the sum of economic disasters against which it is aimed to protect, and that it is outside the proper limit of State activity.

"In the main," says Gordon, "the *Insurance Act* in England has done a vast amount of good" and Newsholme's opinion is that "notwithstanding draw-

¹ Read at the Annual Meeting of the Public Health Association of Australia in Melbourne on September 5, 1925.

backs, the various forms of social insurance now in force are doing excellent work. They all strike more or less successfully at one of the greatest evils in life—uncertainty of continuous ability to maintain self and family.”⁽¹⁾

In order to state clearly the defects and omissions which mar existing schemes of national insurance, it is necessary to consider as clearly as possible the requirements of the position to be met. These may be stated as financial requirements and health requirements; as this Congress is concerned more about the latter, I shall deal very briefly with the former and only on the relationship of cash benefits to health.

The coexistence of these two benefits, cash and medical, in one system is the big fundamental weakness of all compulsory State insurance acts. The very important duty of providing a person when he is ill with the means for the maintenance of himself and his family is a legitimate and proper field for insurance funds. But it is infinitely more important that he should be speedily restored to health, so that he shall again take up his rôle of breadwinner. Thus the question of individual health is involved and in a large social scheme the health of all included in the scheme. But this is merely part of the larger view of the health requirements of the whole nation. Briefly put, cash benefits as at present doled out in England and elsewhere, are inadequate in amount and unequal benefits are given for the same contribution. They probably will remain inadequate unless the contribution is raised, whilst actuaries are permitted to maintain their conservative methods of calculation and will remain unequal whilst the “Approved Society” system of administration is persisted in.

Gordon states that some of the great defects of State insurance in England are the unnecessary complexity of its structure and the vast amount of overlapping between ten thousand separate bodies involved and the lack of the personal touch in its administration.

The personal touch will necessarily vanish with the advent of State intervention and it is a vanishing quality in voluntary insurance work today with the diminishing interest in the social side of friendly society activities.

Apart from this loss the avoidance of inadequacy and inequality of benefits and unnecessary complexity and overlapping of administration is an essential requirement of State insurance and the desirability of accomplishing this is one of the important reasons for consideration of its establishment.

The Royal Commission has recommended a sickness benefit of 30s. per week which is certainly more generous than any existing State or voluntary benefit for a similar rate of contribution. Overlapping and inequality can be prevented only by the pooling of all society funds into a national health insurance fund which is proposed by the Royal Commission. This, of course, would remove

the one claim to existence which the “Approved Society” system possesses.

The provision of financial benefit at appropriate times has a direct bearing on the health of the insured person, as it tends to alleviate mental distress and anxiety. Apart from this the only essential relationship between cash benefit and medical benefit is the writing of certificates by the medical attendant entitling to cash benefit. Yet there is a constant clash between them in all countries.

There is a group of benefits called additional benefits provided in some insurance acts, the administration of which is in the hands of “Approved Societies,” sickness societies and the like, by which dental and optical treatment, aids towards surgical appliances or cost of hospital and convalescent home treatment is permitted, but also the additional benefit may take the form of an increase in the cash benefit. Much was hoped from this provision, but the conception of its value adopted by the “Approved Societies” is illustrated in the report of the Ministry of Health, 1924-1925, which states that at the end of 1924, 6,612 additional benefit schemes were in existence. Of these 5,358 were for cash increases only, 1,104 for cash and non-cash.

National health insurance should be viewed from the great national aspect of the prevention and cure of sickness and it is impossible to combine in one measure a huge financial system of cash benefits and an equally vast organization of purely professional men. Sickness and similar benefits are self-contained cash benefits, based merely on actuarial science and logically capable of restriction to persons paying contributions for them. But medical or treatment benefit is quite a different matter. From the community point of view there is only one thing to be considered and that is to prevent the incidence of illness as far as possible wherever it may occur. To the medical man the measures for the prevention and cure of sickness are identical for all persons and for all ranks of society and therefore any social scheme should provide for all. No so-called national insurance scheme has done this, but instead adopts the easy path of providing for a section of the people that which is most accessible for all, namely, medical treatment.

A very grave fault in social insurance as at present practised is that, being contributory, it does not provide shelter against “the slings and arrows of outrageous fortune” for all who need it, but only for a section of them.

Roberts has rightly pointed out:⁽²⁾

It is ridiculous that a measure, claiming to be national in its purpose, professedly intended to place adequate medical treatment within the reach of those unable to provide it for themselves, should be so framed as to not only exclude from its provisions all those forms of medical service, such as surgery and everything included in the term hospital treatment, which are, by universal agreement, of the greatest value, but to treat as non-existent the wives and families of employed persons, as well as those who, through mental and physical defect, are unfit

for commercial employment, and actually to deprive of all medical attention even the employed people themselves if, as a result of industrial depression, they are for any considerable period of time thrown out of work. It is an absurdity that whilst a certain measure of poverty is insisted on as entitling a man or woman to such medical services as are provided, a still further degree of poverty—creating a situation of even greater need—serves to disqualify.

Besides the limited application of the health benefits, difficulties of administration of the two benefits in one scheme are very great and because of this incompatibility constructive critics have quite seriously proposed the elimination of medical benefits altogether. As is now well known the report of the Royal Commission states that after reviewing the reports of the experience of other countries, it is not desirable to include medical benefit in any scheme for financial benefits, but they should be dealt with under a national health scheme. In giving evidence before the Royal Commission, the Commonwealth Statistician emphasized that a really national health scheme has nothing in common with a system of insurance.

Sir Arthur Newsholme, a high authority on public health in England, gives his opinion⁽³⁾ that there is much to be said for the abolition of the medical benefits in the *Insurance Act* and its merging into a wider scheme which would need to be elastic enough to insure equally good medical aid for those unable to pay insurance premiums.

Alban Gordon, a layman, takes the same view in dealing with the difficulties of medical benefit which has always, not only in England but in all countries which have adopted schemes of social insurance, "been its most bitterly controversial point, a veritable storm centre from which every year or two fresh lightnings of discord flash." "It is obvious," he says, "that the lion and the lamb will lie down together sooner than the panel doctors and the 'Approved Societies' and the question of the control of medical benefit has so far defied solution. And yet a simple and efficacious solution lies ready to hand—remove medical benefit from the *Insurance Act* altogether, as has already been done with sanatorium benefit."

The Irish *National Insurance Act* was framed without including medical benefit.

There are very grave defects in the health provisions of insurance acts and it will be seen that these are common to all forms of contract practice. They have been stated over and over again, but reiteration is necessary. They take the form of almost completely ignoring the two paramount health needs of our time, namely, the prevention of disease and the provision of facilities for the early diagnosis of disease.

There is no need to argue the case for the greater value of preventing sickness than of paying compensation for it when it occurs and yet, as has been stated, under the provisions of the *National Insurance Act* over £20,000,000 was expended in 1923 in benefits, but practically nothing was laid out on prevention, except for a minute grant of a

few thousand pounds for research and certain expenditure on dentistry and the like which may be considered as partly preventive in character. Nor is there any recognition of the close and intimate connexion between preventive medicine and economic conditions.

The medical benefit provided by friendly societies on a voluntary basis has this defect. As the report of the Royal Commission states: "Friendly societies have never dealt with their members from the preventive aspect."

Apart from the title of the Act in Great Britain, there are only two preventive measures provided for, namely, arranging for health lectures and inquiry into cases of excessive sickness; these have never been utilized. The intention of the founder of the scheme was perfectly good, but the preventive side has been crowded out in the welter of complex administrative difficulties and the overwhelmingly financial aspects of the Act.

"Insurance," Newsholme states, "is not a means of preventing the evil against which one insures, although it may be made a handmaid of prevention and can be made to conduce to recovery by diminishing financial anxiety, by supplying some of the familiar means conducing to recovery and by rendering possible early and continuous treatment of sickness to the extent to which this treatment is skilful and appropriate to special needs."

It is unfortunately apparent that very many people are in a short-sighted way desirous of making medical benefit a handmaid of financial insurance.

Again, in addition to the ignoring of preventive measures, medical benefit as at present devised and provided in existing systems, takes no account of the outstanding medical need of the day, a vastly increased provision for early diagnosis of disease, available for all ranks of society. It falls short of the sweepingly generous "adequate medical attendance and treatment," laid down by the *National Insurance Act* of Great Britain. No specialist services or institutional treatment of any kind are included. And in passing one must again refer to the inequity of the "Approved Society" system of administering what slight additional benefits of a medical kind are provided. Only a limited number of "Approved Societies" give such essentials as dental treatment to their members. The difference between different societies in this respect is very great. Some more fortunate insured persons get free or assisted dentistry, grants in aid of optical treatment, spectacles and surgical appliances or towards the cost of hospital or convalescent home treatment; others get a few of these; others again get none at all. And yet all insured persons pay the same contribution. It is almost certain that a similar system of unequal benefits would evolve if a similar method of administration were adopted in this country.

The weakness of all contract medical practice is its incompleteness and its inadequacy. It provides, as I have said before, only that which is most

easily within the reach of every member of the community. In this Commonwealth, apart from reasons of distance, it is literally true that no person need be without medical aid in time of sickness or accident. But adequate and complete medical attendance, including all the many expensive aids, laboratory and otherwise, to early diagnosis and treatment, is not readily available except to the poor in the public hospitals, where they must accept charity and the rich who can purchase these aids. Both compulsory and voluntary insurance schemes have failed to meet this need, because of the expense and because of shortsightedness and the clash of cash benefits with medical needs and the constant impulse to increase the inadequate cash benefits at the expense of the adequacy of preventive and curative medical provisions.

In contemplating the health needs of the community it is necessary to eliminate any self-satisfaction that may be felt with existing provisions. It would be a very grave error to consider merely the extension of the present system of contract practice as provided by national insurance in England and friendly societies in Australia as an integral part of a social insurance scheme. It is not the fault of the medical profession that the contract system is inadequate and incomplete. Within its limitations the service given by lodge surgeons in Australia is of a very high order and equal to the best general practitioner service in the world. But it is impossible either on the very low rate of remuneration paid in Australia or the relatively higher but still low rate in England to provide full and adequate investigation and treatment of disease to insured persons.

If medical benefits are to be included in the scheme, then certain broad principles, as enunciated by the medical profession in Great Britain, should be regarded as fundamental.

(a) They should be available only for those persons who would be unable to obtain them without the help of the insurance scheme.

(b) The medical provision made for such persons should be as far as possible complete.

(c) The conditions under which medical attention is given, should approximate as nearly as possible to those of private practice.

(d) Medical representatives should be closely associated with the administration of the scheme and as far as questions of purely professional conduct and treatment are concerned, judgement should be in the hands of purely professional bodies.

(e) Remuneration of the medical practitioner should be on such a basis as (i.) would produce an income of not less than that which corresponding responsibility and work would produce in private practice, regard being had to all relevant considerations; (ii.) would not prejudice the continuous supply of the best type of practitioner.

As the medical benefit in insurance schemes is so unsatisfactory for the reasons outlined, some alternate scheme is necessary to meet what is an admitted need.

In the draft memorandum of evidence placed before the Royal Commission on National Health Insurance now sitting in England, the representatives of the medical profession stated that:

The organization of a national health insurance scheme is not necessarily or even probably the best means of utilizing limited resources for the promotion of national health. It is more than likely that there are a number of other directions in which, severally or collectively, a corresponding expenditure would produce an even more satisfactory return. Such are: (1) proper housing, (2) town-planning with the proper provision of open spaces and recreation facilities, (3) smoke abatement, (4) a pure milk supply, (5) public-house reform and the regulation of the sale of alcoholic beverages, (6) the destruction of vermin, (7) education, (8) the aiding of medical research. If, however, resources are sufficient or if for other reasons it is deemed desirable to organize a national health insurance scheme, a second general consideration becomes of paramount importance, *viz.*, that regard should be had primarily and constantly to the maintenance of health and the prevention of disease and not merely to the provision for the alleviation or cure of morbid conditions when once they have arisen. To this end it is essential not only that the attention of all practitioners should be directed continually to the preventive aspects of their work, but that the existing machinery and medical officers of the public health service should be brought into close and organic connection with the insurance scheme.

To the medical mind which has given consideration to the aims and objects of social insurance, this is a satisfactory statement of the requirements of any proposed scheme.

The proposal to nationalize the medical profession has been quite seriously made as an alternative to national health insurance with medical benefits, but the objections to such a step are so apparent and obvious as to be hardly mentioned.

In a State medical service, to quote Newsholme, the *desiderata* are as follows:

1. Each patient requires to be considered in relation to his circumstances, as to housing, sanitary conditions and ability to provide nursing and other aids to recovery, as the prospect of recovery depends largely on the domestic conditions under which the patient is attended.

2. Every case of illness should be considered from the point of view of prevention as well as treatment. Prevention of unnecessary protraction or recurrence of illness is to be aimed at as well as removal of causes. Thus the health visiting and nursing staff is required as well as the doctor.

3. The doctor should be in a position to call for a health visitor or nurse and he should therefore be in touch with the local machinery for public health administration.

4. So far as a large number of diseases are concerned, there is no distinction between prevention and treatment.

A satisfactory medical service must be both hygienic and therapeutic. In many respects these overlap and separation of the two is inimical to public interest.

The chief branches of such a service will be: (i.) Research; (ii.) pathological and bacteriological, giving all possible facilities in diagnosis and treatment, including diagnostic laboratories; (iii.) public health, comprising divisions of industrial and school

hygiene and statistics. The ideal is a complete record of each person's physical and medical history; (iv.) clinical (a) institutional, residential and out-patient, (b) domiciliary.

The clinical service will comprise attendance for all forms of sickness, including expert consultative and treatment facilities equal in essential respects to those now available for the rich. All influences, monetary or otherwise, tending to inhibit the full use of the medical service to the extent indicated by the medical needs of the patient must be abolished. This should apply equally to domiciliary and to institutional treatment.

It should be quite possible, if a Commonwealth insurance department is established, to make it essential that all beneficiaries shall be insured against the cost of medical attendance with free choice of medical attendant. Such provision would cover not only employees whose incomes are within a prescribed income limit, but unemployed and unemployable. It would cover all kinds of sickness and injury and provide for all methods of diagnosis and treatment. The medical attendant would have no list of beneficiaries who would look to him for attendance, but would attend all patients who come to him of their own choice as in private practice under sufficient safeguards. Patients would be free to change their medical attendant subject, of course, to the customary professional usages. The medical attendant would be paid by fee, recoverable from the insurance department, in accordance with a scale of fees and charges agreed upon. The same fee would be payable in respect of all insured persons for the same service, although the unemployed in most cases and the unemployable in all cases would be non-contributing beneficiaries.

Conclusions.

1. Social insurance to provide cash benefits for those who need it, has proved beneficial in other countries and would probably be beneficial in Australia.

2. Medical benefit should be provided apart from financial benefit.

3. Whether included in a scheme of social insurance or not medical benefit should be viewed from the great national aspect of the prevention and cure of disease and should provide in the first instance for the means of prevention of disease and of facilities for the early diagnosis of disease, such as, for example, accessible laboratories.

References.

- (1) Alban Gordon: "Social Insurance," 1924.
- (2) Harry Roberts: "A National Health Policy," 1923.
- (3) Arthur Newsholme: "The Ministry of Health," 1925.

INTOXICATION FOLLOWING THE USE OF COAL TAR PAINTS.

By SURGEON-LIEUTENANT COMMANDER T. A. KIDSTON, R.A.N.

My duties at Garden Island have brought me in contact with a (to me) new form of intoxication that may interest those of my colleagues whose

practice includes industrial medicine. The condition occurred amongst a number of men (painters and labourers) engaged in applying coal tar preparations to the inner walls of bunkers and similar confined spaces in His Majesty's Australian Ships and Auxiliaries. The cases occurred in two batches. Two, "A" and "B" were stokers employed in a bunker in a light cruiser; the remainder were dockyard employees working in an oil tank in a fleet auxiliary ("oiler"). The conditions were similar in both cases, namely: Six to eight men were working in a small, confined and ill ventilated space in the bottom of a ship in summertime and were using a compound of which the vehicle appeared to be naphtha and (or) other coal tar derivatives.

The premonitory symptoms complained of were in most cases few and mild. Onset was sudden and almost unperceived. Patients "A" and "B" collapsed without warning, "B" "went out" almost unobserved during the operation of removing "A" and "E" was not aware he was affected till he attempted to climb a vertical ladder to leave the tank. The symptoms described by the patients and the signs observed on examining them are shown in the attached table.

At no time was there any dermatitis or any symptom of bronchial or gastric irritation. Examination of the urine of five patients on the day after the intoxication revealed no albuminuria.

Treatment consisted of fresh air, light massage of the limbs and rest. Patient "D" received some artificial respiration, but probably did not need it. Four patients were given expectorant mixtures without appreciable result. In no case were stimulants deemed to be indicated.

Analysis of a sample of the preparation used by patients "C" to "G" inclusive revealed that coal tar naphtha and light coal tar oil were the solvents used. Traces of benzine and appreciable quantities of toluene and xylene were also present. The solid element appeared to be carbon alone. There was no evidence of definite toxic substances.

Interpretation of the signs and symptoms produced in the light of the analysis of the compound and the conditions under which it was used, led to the following conclusions.

(i.) Coal tar naphtha vapours, given off in a warm and confined space (that is not freely ventilated) are sufficiently narcotic to produce temporary insensibility.

(ii.) The effect mentioned is enhanced by the presence of benzine, toluene, and (or) xylene (it may be due entirely to these bodies).

(iii.) The effects are mild and temporary, causing no ill to the human system.

(iv.) The use of these compounds in open air or in well ventilated spaces is unattended by any risk to the men using them.

(v.) Any risk attending their use in confined spaces is due to the possibility of a fall from a scaffolding (in a deep compartment) or from asphyxiation where a man is overcome and remains for a long period in a bunker or tank.

SYMPTOMS.	PATIENTS.						
	A.	B.	C.	D.	E.	F.	G.
Dizziness	**	**	*	*	***	*	*
Lachrymation	*	*					
Nasal Irritation	*	*		*	*		
Exhilaration		*		*	*		
Gastric Malaise		*		**	*		
Muscular Weakness	*	*		*	**		
SIGNS.							
Unconsciousness	**	*		***			
Muscular Incoordination	***	***	*	***	**	*	*
Muscular Flaccidity	**	*		*		*	
Cyanosis	*	*		*			
Pallor					*	*	
Pulse (per minute)	90	82	80	84			
Respirations (per minute)	28	22	25	25			
Stertorous Breathing	*	*		*			
Diminished Corneal Reflex	**			**			
Diminished Reaction to Light	*			*			
Dilated Pupils	*	*		*			
Conjunctivitis	*	*		*			
Retching				*			
Recovery Time (in hours)	1½	1	1	1½	1	½	½

The asterisks indicate the degree to which the symptom or sign was observed, *** being equivalent to "severe" and * to "slight."

Pending the investigation of these cases the use of these paints was discontinued. On completion thereof their use was recommended subject to the following conditions:

- (i.) Free ventilation of the compartments to be coated.
- (ii.) Safety lines to be used when work is being carried out on scaffoldings.
- (iii.) Instruction of the workmen as to the nature of the intoxication.
- (iv.) Efficient arrangements for the removal of any affected workmen.
- (v.) Supervision by medical officers of working conditions generally.

The use of coal tar preparations has been continued subject to the above conditions and there have been no more cases. The workmen have lost their apprehension in respect to it. This latter consideration illustrates an aspect of a dockyard medical officer's work that is often lost sight of. On him frequently rests the responsibility of stopping or continuing important work. Between protecting the workmen and facilitating operations he often has to solve problems such as do not fall to the lot of the average practitioner and towards the solution of which textbooks do not always offer material help.

Reviews.

THE FEMALE PELVIS.

DR. R. H. PARAMORE'S BOOK, "The Statics of the Female Pelvic Viscera," is as the author tells us an historical and critical survey of "prolapse" and of its operative treatment

up to the end of last century.¹ It is complementary to the first volume, its main purpose being the solution of the problem as to how the pelvic viscera are retained in the normal position and the nature of prolapse.

The method of inquiry involves the detailed description and discussion of a great many operative procedures, many of which are now discarded.

The work is divided into four parts. Part I. treats of the inception of plastic procedures, the first operation for prolapse, the first elytrorrhaphy, C. Marshall Hall's operation, the vaginal-pleating operation of Jobert, extirpation of the womb and Baker Brown's operation for prolapse. Part II. deals with the rise of plastic procedures, the amputation of the cervix and perineorrhaphy, covering the work of Huguier, Rizzoli, Simon, Kuckler, Duncan, Milne, Bantock, Tait, Thomas and Emmet. Part III. treats of the rise of vaginal operations, with a description and review of the operations of Marion Sims, Emmet, Duncan, Hart, Hegar. Part IV. is mainly concerned with colpo-perineorrhaphy and its teaching and the conception of prolapse as a hernia. The author describes and discusses the operations of Simon, Hegar, Martin, Bischoff, Winckel, Pozzi, Garriques, Hart and Barbour, Kelly, Herman and others.

It will be seen that Dr. Paramore has traversed a wide field of surgical endeavour, adding a most interesting and informing chapter to the history of specialized plastic surgery. With so many operations for text, comment is inevitably extensive and in analysing the "motives" of the various procedures, in balancing the merits and demerits of an individual operation, the judicial mind and critical acumen of the author are reflected in his judgement. There is a thoroughness and sincerity about the work which it would be difficult to overestimate.

Following on the exposition of so many weaknesses and traditional fallacies inherent in the theory and practical treatment of prolapse, Dr. Paramore devotes the penultimate chapter of his book to the enunciation of his views. Regarding "prolapse" as a hernia, which he prefers

¹"The Statics of the Female Pelvic Viscera," by R. H. Paramore, M.D. (Lond.), F.R.C.S. (Eng.); Volume II. 1925. London: H. K. Lewis and Company, Limited. Demy 8vo., pp. xviii. + 424, with illustrations. Price: 24s. net.

to call "pudendal," he shows the analogies between it and other herniae, lays stress on the part played by an enlarged pelvic floor aperture and dismisses in no uncertain language what he considers mistaken ideas regarding the relation between the supporting power of visceral structures and intraabdominal pressure. This chapter in our opinion is the most interesting one of the volume. If it does not take the matter out of the domain of controversy, it is at least a "constructive" theory, the outcome of long and earnest study. For this reason it will repay thoughtful consideration.

Dr. Paramore's book is an uncommon work; its attempt to solve a difficult problem and the searching investigation it has involved are worthy of the highest praise.

EMPHYEMA.

Or never failing interest is emphyema. We therefore take up "Some Fundamental Considerations in the Treatment of Empyema Thoracis," by Dr. Everts Graham¹ with great readiness on learning that the author has had an unrivalled opportunity of studying a very large number of cases in the epidemic which ravaged the military camp of the United States during the Great War.

He maintains (and the majority of surgeons will agree with him) that progress in the treatment of this disease has been hampered by a tendency to proceed along the same lines as if emphyema were an ordinary abscess. The principles that he sets out to establish are: (i.) Careful avoidance of open pneumothorax in the acute stage; (ii.) the prevention of a chronic emphyema by the rapid sterilization and obliteration of the infected cavity and (iii.) careful attention to the nutrition of the patient. Surgeons who have had experience of the older methods and of those advocated by the author, will have no hesitation in agreeing with him.

To the world war cannot be ascribed many benefits, but we can certainly trace a distinct improvement in the treatment of emphyema and of chest wounds generally, because of the experience gained in it. The tragedy is that we did not gain it earlier and that we were not prepared for it. The book is a short one and very readable. It holds the reader's interest from start to finish.

OPERATIVE SURGERY FOR THE STUDENT AND HOUSE SURGEON.

It was no easy task for the writer of a treatise on operative surgery to compress his material within the limits of some hundred pages, yet Sir William de C. Wheeler not only done this, but has produced a book of value particularly to students and house surgeons.² In the first two editions the impossible task was undertaken of making an appeal at once to the student who was performing operations on the cadaver, and to the experienced surgeon. The third edition, written in the shadow of the Great War, sought to render assistance to the general practitioner suddenly called upon to perform an emergency operation. It was obviously impossible in so small a compass to satisfy the needs of the student whose horizon is bounded by examination requirements and of the embryo surgeon who, brushing aside academic considerations, seeks a helping hand in new ventures. Now in the fourth edition the book finds its proper place in its adaptation to the needs of student and house surgeon and as such it will be a welcome addition to the library.

That obsolete amputations still find an honoured place in so small a textbook is a concession to mere examination interests and at the same time an illustration of the

difficulty with which old customs are shed. Hey, Skye, Lisfranc, Chopart and Roux, whose amputations a preceding generation learned painfully and meticulously, remain still to burden the heavily weighted student of today and yet these amputations can be compared only with those beautiful long amputation knives which in polished cases repose in the surgical armoury of our hospitals. Unused, they yet keep their place, mere milestones on the road of progress.

In the domain of amputations the late war made a *bouleversement* which can be paralleled only by that following the introduction of anaesthetics. Few, indeed, in our own time can recall having seen the wonderful association of dexterity and skill, the carefully worked out plan of cooperation between surgeon and assistants which permitted an amputation by transfixion to be performed even at the hip joint on the conscious patient in but a few minutes. Stokes and Gritti, Faraboeuf and Teale and others are mere names for procedures which are dead but not yet interred. No doubt the artist of preanaesthetic days possessed rare qualities of mind and hand, but the average surgeon of today performs an operation which, if less striking, is more conservative, an operation adapted to the particular condition and executed with a thought for the instrument maker.

There is a useful chapter on anaesthetics and a plain description of the simpler methods of blood transfusion. The illustrations which are excellent, add value to a book, not the least of the virtues of which is that it is not encumbered by a multiplicity of methods.

HÆMOPTYSIS IN TUBERCULOUS PATIENTS.

DR. S. F. SILBERBAUER in his translation of Dr. Marc Jaquero's little treatise on "Hæmoptysis in Pulmonary Tuberculosis" gives us an up-to-date discussion on the different aspects of this subject.³ The author recognizing that hæmoptysis frequently appears, especially to the young practitioner as a serious accident, intends to prove how with fuller knowledge, its risks can be considerably discounted. Besides treatment can be satisfactory, only when all the facts causing the hæmorrhage are properly understood.

From his experience in over eight thousand cases he shows that in the large majority of patients hæmoptysis occurs in the second stage of the disease and in comparing the anatomical changes that occur in the different stages of tuberculosis, he concludes this should be so.

He deals in detail with the different clinical types of hæmoptysis including what he terms the "asystolic type of hæmoptysis" which in Australia is by no means rare. Moreover in one instance pulmonary calculus is shown to be the cause of frequent bleedings.

The dangers following hæmoptysis are quickly passed over, while more stress is laid on special exciting causes. Prophylaxis is naturally based on the prevention of all exciting causes, as the avoiding of fatigue, over-effort, intense emotion, over-feeding especially with meat diet and the avoidance of certain drugs.

Treatment is based naturally on the type of the bleeding and the stage of the disease. In early cases rest and general prophylactic measures are sufficient. "Codeine" is the drug recommended should a drug be needed. Warning is given against using so many of the drugs previously recommended, as having been proved useless. Morphine is shown to have special dangers in the early stages, but unfortunately its value in the later stages of hæmoptysis has been overlooked.

In dealing with a case of hæmoptysis the essential is to convince the patient of the relatively slight risk he runs and it is the aim of this little book to do this. As well as assist the physician in the more serious cases. It should prove valuable especially to the recent graduate.

¹"Some Fundamental Considerations in the Treatment of Empyema Thoracis," by Everts A. Graham, A.B., M.D.; 1925. St. Louis: The C. V. Mosby Company. Demy 8vo., pp. 110, with illustrations. Price: \$2.50 net.

²"Handbook of Operative Surgery," by Sir William Ireland de C. Wheeler (Mod.), B.A., M.D. (Dub. Univ.), F.R.C.S.I., F.A.C.S. (Hon.); Fourth Edition; 1925. London: Baillière, Tindall and Cox. Post 8vo., pp. xiv. + 441. Price: 15s. net.

³"Hæmoptysis in Pulmonary Tuberculosis," by Dr. Marc Jaquero, translated by S. F. Silberbauer, M.D., F.R.C.P. (Edin.). 1925. London: Baillière, Tindall & Cox. Crown 8vo., pp. vii. + 106. Price: 5s. net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 13, 1926.

The Artificial Feeding of Infants.

Of all the problems in hygiene that of the safeguarding of infant life and health is perhaps the most important. The prosperity of the race depends on the success attending efforts to this end. It is not enough to reduce the mortality of infants under two years of age; a race largely composed of persons handicapped by the baneful effects of a bad start is unlikely to be virile, physically powerful or mentally superior. In their report recently issued the Royal Commissioners on Health have pointed out that improvement has been brought about by the careful instruction of mothers in the importance of breast feeding; nearly all mothers can feed their infants at the breast if proper instruction be given and if sufficient care be taken. The truth of this has been demonstrated over and over again under the most varied conditions. No better evidence can be afforded than that of the records of the three admirable Australian institutions for the training of nurses to propagate the gospel of mothercraft. We refer to the Tressillian School of Mothercraft, the Tweedle Hospital for Babies and School of Mothercraft and the Victorian Baby Health Centres Association. The teaching, however, does not penetrate very far. While a very small proportion of the mothers of Australia comes under this beneficent influence, the average woman still feeds her baby in a haphazard and most improper manner, either because she is misled by relatives, friends and neighbours or because she is deluded by the unsupported claims of some of the advertised foods. There is a deleterious tendency at the present time on the part of the manufacturers of patent foods and proprietary remedies to teach the medical profession dietetics and therapeutics through advertisements. The education of the public in the science and art of infant care must be taken out of the tradesman's hands by the medical profession.

Nearly every mother can and should suckle her own baby. If the mother is dead or if she is physically or mentally incapable of realizing the greatest joy of mankind, this function can be undertaken by a foster mother. A healthy woman usually has sufficient milk to satisfy two babies without detriment to herself. The public must be compelled to understand that there are no other biologically correct methods of feeding babies. Artificial feeding is at best hazardous, uncertain and difficult; it may be disastrous. But it is terribly common. Women require so little persuasion to give up the struggle during the period of the establishment of lactation and to adopt the easy and comfortable expedient of the bottle or the spoon. They fail to recognize that baby's digestive powers have to be trained; that the proteolytic, amylolytic and fat splitting ferments are present in such small quantities in the early stage of infancy that Nature usually resents the imposition of an extra load of foreign protein, starch or fat.

Manufacturers of biscuits too often recommend arrowroot or other starch-containing biscuits for young infants. We are pleased to state that ever since we investigated the manufacture of Arnott's biscuits, this firm has quoted our conclusion that their milk arrowroot biscuits can be recommended as "articles of diet of high nutrient value for children (not infants) and adults." In Western Australia the Health Commissioner has recently taken steps to prevent manufacturers of biscuits from advertising their wares as suited for babies under one year of age. This measure is admirable, but it is insufficient for the purpose. Some mothers, torn by pity for their crying babes and ignorant of the fact that a baby cries as a result of the irritation of products of partially digested food stuffs and of the consequent fermentation in the large and small intestine, commit added indiscretions when they have started unsuitable artificial feeding. It is not uncommon for the pernicious "dummy" to be dipped into a starch-containing food, into glycerine, into syrup or into broth and given to "soothe" the babies. The relief is, necessarily, short-lived. Another source of trouble is the employment of a starch-containing diluent for milk, such as barley water. They do not know that it requires

much skill and knowledge to nourish an infant with a mixture containing starch.

There is but one remedy for this very common habit of the improper artificial feeding of young babies. It is an organized campaign of education of mothers by competent persons. The campaign must be widespread, indeed universal. It must be free from all departmental interference. It must be vigorous, definite, authoritative. And it must be untrammelled by all assistance from firms or persons financially interested. A Government subsidy, as suggested by the Royal Commissioners on Health, is needed.

TARIFF REGULATIONS AND DRUGS.

We have on numerous occasions pointed out that it is intolerable that the treatment of disease should be affected directly or indirectly by political considerations. All drugs, apparatus and instruments needed for the treatment of disease should be excluded from tariff regulations and other restrictions, save those needed for the prevention of abuse. Health is a national asset and it is economically unsound to impose a financial penalty on it. An example of the interference by official red tape with the importation of a useful therapeutic preparation is cited. For a considerable time the stock of "Omnopon" held in Australia has been very limited. It appears that Switzerland has but recently joined the Opium Convention. Before this was effected "Omnopon," a preparation of all the alkaloids of opium, was admitted under restricted conditions into Australia. Since Switzerland came into line with Great Britain and other countries in this regard, it has been necessary for a licence to be issued by Great Britain to sanction the importation of this preparation from the manufacturers, Hoffmann-La Roche Chemical Works, Limited. The issue of this licence has been delayed through official dilatoriness. We understand that supplies will be forthcoming within a short time, but in the meanwhile medical practitioners wishing to prescribe "Omnopon" for their patients, are being prevented by the deplorable application of departmental regulations to the detriment of the Australian people.

Current Comment.

HYDRONEPHROSIS.

HYDRONEPHROSIS has been described as a chronic, aseptic retention of urine in the kidney and renal pelvis due to obstruction. At first sight this definition seems to be very simple and complete. In regard to hydronephrosis from such obvious causes as calculus and new growth involving any part of the urinary tract there can be no question, but it is by no means clear that obstruction is the primary factor in all forms of the condition. Moreover, congenital and acquired forms have been described and it has been suggested that congenital abnormalities predispose to subsequent hydronephrosis. In the latter case it will be difficult to explain why no symptoms are produced until the patient has reached the second or third decade of life and why they are not produced in every person in whom the abnormalities are present.

Mr. H. P. Winsbury White has recently discussed the pathology of hydronephrosis in a lecture delivered at the Royal College of Surgeons of England.¹ Mr. White holds that the diversity of opinion as to the primary ætiological factor in the pelvic type of the disease is largely due to lack of opportunity in the past to study the condition in its earliest stages. He has devoted careful study to one hundred and fifty-nine cases. In his classification he makes no distinction between those cases in which a blood vessel is said to be compressing the ureter and those in which this is not evident. He holds that after division of the offending vessel, there is no difference in the appearance of the two varieties and that there is no reason to believe that the ætiology is not the same in the two cases. The hydronephrosis in these circumstances is characterized by dilatation beginning at the uretero-pelvic junction. Of the one hundred and fifty-nine cases in Mr. White's series one hundred and thirty-six were of the latter or pelvic type.

Hydronephrosis in children is frequently accompanied by dilatation of the corresponding ureter. When the ureter is not involved in the dilatation, an abrupt demarcation can always be seen separating a distended pelvis from a narrow ureter. Inadequacy of the ureter has been regarded as the chief cause of hydronephrosis of the latter type and in view of the varying age at which symptoms may arise, it is difficult to distinguish between the congenital and the acquired disease. A late appearance of symptoms in Mr. White's opinion is in favour of the condition being acquired. He points out that such features as high or oblique insertion of the ureter into the pelvis and contracted or valve-like pelvic outlet, often referred to as congenital, are seen only in advanced stages of hydronephrosis and are a consequence not the cause of the disease. He comes to this conclusion as the result of the study

¹ *The British Journal of Surgery*, October, 1925.

of early cases. The presence of old standing inflammatory change in the ureters and pelves of the earliest specimens strongly suggests that the inflammation is of longer standing than the dilatation. Thus a patient had suffered from attacks of pain for three years. At the time of operation it could not be definitely determined from the appearance of the organ that it had been the seat of a general dilatation. On microscopical examination, however, a considerable degree of muscular hypertrophy was found in the wall of the pelvis. Again, thickening of the ureter was found after operation on a woman who had suffered from attacks of pain for three and a half years. The thickening was found to be due to an accumulation of fibrous tissue in the mucous coat. A narrowing of the lumen had resulted. These changes were regarded as being the result of a past infection in the wall of the ureter. In none of Mr. White's early specimens was any kinking or angulation of the upper end of the ureter present. This change is a common feature, however, of advanced cases of hydronephrosis. It is due to one or both of two causes, namely, implication of the upper end of the ureter by a renal blood vessel or a sagging of the pelvis below the level of the point at which the ureter joins the peritoneum. The presence of inflammatory strictures was demonstrated in the upper end of ureters which appeared to be perfectly healthy. Hot jelly was injected through the divided end of the ureter of kidneys removed *post mortem* from the bodies of adults. In several specimens strictures were discovered and in every instance, though no recent active inflammation could be seen, stenosis was found to be caused by an accumulation of well formed fibrous tissue in the mucous coat. The appearance was indicative of a previous inflammatory focus. The fact that their presence was only occasional, was regarded as indicative of their abnormality. In addition to the narrowing of the ureter in the early stages of the disease, pyelitis is generally present and exacerbation of the pyelitis will explain the attacks of pain which occur without apparent cause in most cases of hydronephrosis. Mr. White holds the view that milder degrees of chronic pyelitis exist with only the scantiest amount of pus and bacterial cells in the urine. They may also be absent at certain periods. He can see no reason why inflammation should always go on to the stage of pus formation in this situation more than in any other part of the body. In support of his views he refers to microscopical changes found in every one of eighteen pelves examined. Some examples are quoted and the changes include high development of the muscular coat, accumulation of fibrous tissue in the mucous and submucous layers and hypertrophy of the epithelium.

It was formerly taught and many clinicians will remember the teaching that renal mobility is a cause of hydronephrosis. Mr. White points out that modern investigators have discredited this view. The abnormal range of movement is a consequence of hydronephrosis and not the cause of it. The

variations in size of the kidney give rise to a stimulating of the fibrous sheath of the fatty capsule and of the vascular pedicle. In the same way Dietl's crises are due to congestion of the kidney and not to an obstructed outlet to the pelvis of the kidney.

Among the commonly regarded causes of hydronephrosis is that of an aberrant blood vessel. Much has been written on the matter. In the records of the Mayo Clinic considerable attention has been paid to it and statistical results of division of the offending vessel have been recorded. Thomson Walker records cases in which an abnormal vessel has been held responsible. Mr. White examines this matter critically. He points out that in the majority of cases recorded no detailed account of the actual origin of the vessels or of the points at which they leave the kidney has been given. He has examined eleven specimens collected from various pathological museums in London. In nine of these the vessel implicating the ureter was a normal inferior branch of one of the main renal vessels. In none was the artery aberrant in the sense that it entered the kidney through the cortex and not by way of the hilum. In some instances the vein and not the artery was the vessel concerned. As a result of dissection of thirty-five specimens the conclusion was formed that the renal artery divides in the upper part of the hilum one branch of which enters the lower part of the hilum by coursing downwards and outwards across the front of the pelvis. It is this vessel which generally implicates the ureter. Mr. White holds that when the pelvis of the kidney becomes dilated, it is forced in a direction of least resistance forward through a gap left between the upper and lower renal vessels in the hilum. As the dilatation continues, the ureter is dragged nearer to the inferior vessel and finally becomes compressed by it. It is when this state of affairs has been reached that a certain amount of relief may sometimes be obtained by division of the offending vessel.

Mr. White's communication is of more than passing interest. It should be read carefully not only by surgeons, but by all those interested in the preventive aspect of kidney disease. Whether Mr. White is correct in all his conclusions or not is relatively unimportant. What does matter is that he points to the early stages when with modern urological methods it should be possible in some instances to prevent the occurrence of hydronephrosis.

AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

IMPORTANT information for those who intend to attend the second session of the Australasian Medical Congress (British Medical Association), Dunedin, 1927, will be published in this journal some time in April. In the same issue a form of application for membership will be found. This form should be filled in, detached and forwarded at once in order to facilitate the work of the Executive Committee.

Abstracts from Current Medical Literature.

MORBID ANATOMY.

Iodine in Exophthalmic Goitre.

WILLIAM FRANCIS RIENHOFF, JUNIOR (*Bulletin of the Johns Hopkins Hospital*, November, 1925) describes the histological changes brought about by the administration of iodine to three successive patients suffering from typical exophthalmic goitre in each of whom the basal metabolic rate was elevated above 50%. Under local anaesthesia the right upper pole of the thyroid gland was excised without damage to the vascular and nervous connexions of the remainder of the gland. Lugol's iodine solution 0.6 cubic centimetre (10 minims) was then given three times daily to the patients and two or three weeks later a double partial thyroidectomy was performed. Great clinical improvement was brought about and this was confirmed by a precipitous drop in the basal metabolic rate. Results of examination of the gland tissue removed at the first and second operations are described. Macroscopic examination of the tissue removed at the first operation revealed a glairy cut surface. From this there dripped a clear lymph-like fluid which was assumed to be a colloidal secretion. Small cyst-like spaces were noted which were suggestive of beginning adenomata and in general the gland appeared vascular and of the beefsteak appearance commonly found in exophthalmic goitre. Histological examination revealed that the gland was divided into lobules by a fibrous tissue stroma, delicate but nevertheless increased in amount and enclosing dilated blood vessels and lymphatics which contained large droplets of colloid. Numerous collections of small lymphocytes were present throughout the intralobular septa. The most striking feature was the enormous increase of parenchyma as compared with the equal reduction of the colloid containing spaces and some areas contained solid masses of epithelial tissue in acinar formation with practically no colloid. When colloid was present in any of the acini, it stained poorly and irregularly, while in some acini it was extremely vacuolated and shrunken. Occasionally some acini were seen containing desquamated epithelial and red cells. The epithelium was of a high columnar type and the acini showed papillary ingrowths of the walls, the larger acini lying towards the centre of the lobule, the smaller towards the periphery. The cells were distended and barrel shaped, the nuclei being large, clear and vesicular, while the cytoplasm was mottled. This latter appeared to be due to the presence of clear colloid substance contained within the cytoplasm in minute droplets. The histological appearance of the tissue removed after the adminis-

tration of iodine was very different. The fibrous tissue was enormously increased and scattered irregularly throughout the gland, whilst the most striking feature was the increase in the amount of colloid present which stained in a deep and uniform manner. A few areas, however, still contained lightly staining colloid, but this was unusual. The regularity of the acini suggested a colloid or resting stage. The lobules were not so clear cut, but the peripheral arrangement of the small acini was still evident in some of the lobules. The blood vessels were much less evident and appeared to be collapsed by the distended acini. Some of the epithelial cells were still of a low columnar type, but the majority of the acini were lined by flat cuboidal cells and in some the cytoplasm was so remarkably diminished that the nuclei stood out like beads in a necklace. The cytoplasm was more finely granular and diffusely distributed, no colloid droplets being present and the nuclei staining deeply with hematoxylin. There were no areas of solid epithelium, only occasional areas of lymphatic infiltration being present and none of the acini contained desquamated epithelial cells or red blood cells.

Plagiocephaly.

D. M. GREIG (*Edinburgh Medical Journal*, June, 1925, July, 1925) raises the question as to whether plagiocephaly is ever a birth deformity. Plagiocephaly, an asymmetry of the skull, is a deformation in which one frontal region protrudes unduly forwards while the opposite occipital region protrudes unduly backwards. It is not limited to the calvarium, but also though not so obviously involves the skull-base. The universally referred to change in the osseous walls to which plagiocephaly may be assigned, is premature unilateral synostosis, but the author thinks that the deformity produced by synostosis of one-half of the coronal suture, which is the usual explanation, is not the deformity of true plagiocephaly. That plagiocephaly might occur in individuals congenitally mentally deficient seems probable, for peculiarities of cerebral development are to be expected. It certainly does not occur in all mentally deficient persons. Except that plagiocephaly is oftener found in macrocephalic than in microcephalic skulls there is no form of mental deficiency particularly associated with this deformity. Lasgue thought that there was a relation between plagiocephaly and epilepsy. The author thinks it doubtful if plagiocephaly is proportionately more common among mentally affected than among normal persons. To the suggested causes of plagiocephaly Broca added the influence of chronic torticollis and certainly in this condition asymmetry of the face and skull occurs, but it is not typical plagiocephaly that is found. Broca explained the asymmetry of chronic torticollis by inequality of the circulation, a

proposition not incontrovertible. Regnault has pointed out that cranial asymmetry is also found in early and congenital scoliosis. Lannelongue describes a seven months' old male child with a right torticollis. The left side of the face was distinctly flattened and the left frontal eminence was less developed than the right; the left cheek was less prominent than the right, the occipital prominence, however, projected to the left and the posterior part of the head was more developed on the left side. The nose was oblique and deviated to the right. These statements cover the usual ground taken by writers on plagiocephaly—an intrauterine irregularity of growth or a postnatal acquired deformity. It is to the period between these that the author draws attention and suggests the possible acquisition of plagiocephaly during parturition.

Progressive Alcoholic Cirrhosis.

ERNEST M. HALL AND W. OPHÜLS (*American Journal of Pathology*, September, 1925) describe four cases of alcoholic cirrhosis and the necropsy findings. All four patients had taken alcohol to excess, though none had died from the disease *per se*. The authors find that from the beginning the process of degeneration of the liver cells and proliferation of the connective tissue go hand in hand. The very early lesions consist of small foci of liver cell degeneration together with definite inflammatory proliferation of the connective tissue. The inflammatory character of the changes is made evident by the presence of polymorphonuclear leucocytes and lymphocytes and the diffuse distribution without close relation to the degeneration. The advance of the inflammation is favoured by the degeneration and necrosis of the liver cells. Even in the relatively early cases there is evidence of regenerative proliferation of the liver cells and these areas are taken to be the group forerunners of the well developed hobnail liver. It was noted that the liver was enlarged in all four instances and that the portal veins were more numerous than the hepatic veins. The new bile ducts were usually found to occur in the connective tissue in close relation to hepatic cells which had the appearance of being recently formed, suggesting the origin of the former from the latter.

Ovarian and Retroperitoneal Teratomata.

ONSLAW GORDON, JUNIOR (*Surgery, Gynecology and Obstetrics*, October 1925) reviews the literature on ovarian and retroperitoneal teratomata and describes a case of the latter type. He observes that ovarian teratomata are either cystic or solid, one being the common benign cystic teratoma or dermoid, the other the malignant solid teratoma. These ovarian tumours are to be distinguished from true dermoids which occur at the lines of embryonic fusion and arise from displacement and inclusion of ectodermal cells. The

former usually contain ectoderm, mesoderm and endoderm. The histogenesis of ovarian tumours is doubtful and two hypotheses of origin are considered. The blastomere hypothesis presupposes that the potential tumour arises at the fertilization of the ovum and that the blastomere becomes isolated and has a quiescent parasitic existence until activated. This activation occurs in postnatal life by some unknown stimulus resulting in the formation of a teratoma. The second and more commonly accepted view is that teratomata arise from the germ cells and this explains the predilection of teratomata for the sex glands. Cystic ovarian teratomata are common and bilateral tumours are not unusual. Malignant changes in these tumours are rare and when they do occur the type is the squamous-celled carcinoma, arising from the epiblastic elements. On the other hand solid ovarian teratomata are very rare and are characterized by embryonic tissue from all three layers of the blastoderm. They develop rapidly and are highly malignant. It is thought that they are of postnatal development. The retroperitoneal teratomata are decidedly rare and are usually cystic, well encapsulated and chiefly produce pressure symptoms. The case described by the author belongs to this latter type.

MORPHOLOGY.

The Taungs Ape.

ALES HRDLÍČKA has published a long and detailed account of his visit to Dart in connexion with the Taungs ape after leaving Australia in 1925 (*American Journal of Physical Anthropology*, October to December, 1925). A detailed description of the site and the history of the "find" is given. The specimen was found in what had been one of a series of limestone caves. These had later been filled with fine red dust. This had incidentally covered up the skeletons of animals such as baboons *et cetera* which had retired to die in the caves. Then the whole cave contents had been consolidated later by limestone infiltration. As regards the skull it is, as is now well known, that of a young individual in which the first permanent molar teeth have just erupted (that is about the stage of a six year old human child). The author believes that it approaches the chimpanzee, especially as regards the size of its teeth, while the absence of eyebrow ridges and concave face place it near the young orang. In all probability it is a new species, if not a new genus of the great apes and approaches rather closely in size and form to the chimpanzee. Taungs is in Bechuana-land, seven hundred and thirty-one miles north of Cape Town and not far from the edge of the Kalahari Desert. The actual limestone quarry where the skull was found is at Buxton, nine and a half miles west of Taungs. In con-

clusion the author gives a number of detailed measurements and description of the skull, based on his own personal observations and congratulates Dart upon the skill and care with which the whole skull and brain cast were "developed."

Engulfment of Living Blood cells by Others of the Same Type.

WARREN H. LEWIS (*Anatomical Record*, September 25, 1925) reports that in the course of investigations on the behaviour of white blood cells in hanging-drop cultures of whole blood from the frog the presence of living mononuclear cells within others of the same type was observed. He points out that it is a rare phenomenon and attributes it to some pre-existing condition in the animal before the blood is drawn. He suggests that it may be associated with the fact that frogs are subject to various infections and parasites which may predispose the large mononuclear cells to exhibit this cannibalistic tendency. Besides the occurrence in a few series of cultures taken from the frog, the only other case in which it was observed among thousands of cultures and smears of living cells was in pulmonary tuberculosis of the rabbit. He further adds that the factors which produce this extraordinary change in the monocytes, are totally unknown, but they undoubtedly are pathological and are probably responsible for the fatal course of certain types of anaemia.

Varieties and the Significance of Giant Cells.

H. E. JORDAN (*Anatomical Record*, September 25, 1925) makes an endeavour to coordinate the widely scattered observations and claims concerning the investigations into the various types of giant cells of the tissues of Mammalia and of the higher vertebrates. He classifies giant cells into (i.) hemogenic, (ii.) phagocytic and (iii.) degeneration syncytic. He claims that his investigations into the question have brought into prominence two additional facts of wide general significance. In the first place there is a high degree of functional adaptability on the part of the mesenchymal derivatives and secondly he draws attention to the enhancement of phagocytic capacity following the event of cell fusions. He cites three recent observations in support of the suggestion that fusion of mesenchymal cells effects a gain in phagocytic speed and efficiency.

Corpus Striatum and Pallium in Varanus.

WILLIAM HERMAN (*Brain*, September, 1925) describes the *corpus striatum* and its connexions in the reptile *Varanus*. The *neostriatum* in this lizard arises from the *pallium* and from the *paleostriatum* and is the homologue of the *putamen* and caudate nucleus in mammals. It receives the

great thalamo-striated tract and is so brought into contact with the trigeminal and thus by its palliad relations functions as a relay in the new touch and oral sense of reptiles. A fibre tract from the pyriform cortex passes to the *neostriatum*. The anterior portion of the *neostriatum* is seen to merge with the *pallium* in the region of the *primordium neopallii* and is so shown to be the result of an inbending of the *pallium*. The *archistriatum* which is the homologue of the amygdala of mammals, is entirely pallial in origin and receives tertiary olfactory fibres. The *paleostriatum* is entirely basal in origin and receives fibres from the *tractus thalamo-striaticus* and sends efferents to the basal forebrain bundle and so to the midbrain. In view of the connexions observed in *Varanus* a brief résumé is given by the author of suggestive findings in certain diseases in man which have shown a selective action on the *neostriatum* and cortex.

Nerve Endings in Hedgehog Muscle.

H. S. D. GARVEN (*Brain*, September, 1925) describes preparations to show the nerve endings in the *panniculus carnosus* of the hedgehog. The muscle fibres cannot be divided into two definite classes. The nerves entering the muscle contain many fine non-myelinated fibres. The motor end plates show great variation in size and shape, but cannot be divided into two definite types. All the muscle fibres appear to be innervated in the same way. The presence of Boeke's accessory fibres and endings can be confirmed. They are apparently of sympathetic origin and have been observed to end on the same muscle fibre which is also supplied by a medullated fibre. The plate endings on the spindle muscle fibres are formed from definitely medullated nerve fibres. In frog muscle thin and thick muscle fibres are supplied by the same medullated nerve fibre in many cases.

Operations on Foetal Rats.

J. S. NICHOLAS (*Anatomical Record*, December, 1925) reports that it is possible to operate upon the foetus of the rat and to secure the animals (operated on *in utero*) alive at the end of the normal gestation period. The rat is applicable to this type of experiment for the following reasons: It is resistant to ordinary infections, the embryo is of a size to be readily handled, the period of gestation is short, the pregnant animal possesses considerable ability to withstand the operative shock without aborting. Shock is found to be lessened by using a posterior route rather than the anterior route which involves handling the abdominal viscera to a greater extent. Experiments so far conducted demonstrate that a limb may be extirpated, the tail excised and the eye removed and that the reactions of the embryo to these types of operation may be studied throughout subsequent development.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SOUTH AUSTRALIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Lister Hall, Hindmarsh Square, Adelaide, on October 29, 1925, Dr. C. T. C. DE CRESPIGNY, the President, in the chair.

Pyo-Pneumothorax Complicating Pneumonia.

Dr. C. M. DELAND on behalf of Dr. F. S. HONE showed a patient, a boy, aged six years, whose condition illustrated an unusual complication in pneumonia. In the first place the patient had suffered from an attack of whooping cough which almost cleared up, but had resulted in a residual spasmodic cough. On July 20, 1925, he had been attacked by double pneumonia and a crisis had occurred on July 25. The temperature had remained down for two days, but had risen again, until on July 29 it was 40.5° C. (105° F.). Rupture of an ear drum had occurred, pus had been discharged and the temperature had fallen. On July 31 it had risen again, the other ear drum had been incised and pus had been found. The child at this time had seemed well, though he had become thin and wasted. On August 3, 1925, the child's breathing had suddenly become very embarrassed and this had increased during the following three days. Signs of fluid had been discovered at the left base and on exploration with a fine needle straw coloured fluid containing some pus and pneumococci had been recovered. At the same time hyperresonance of the left side of the chest with very weak breath sounds and an absence of cardiac dullness to the left of the sternum had been discovered. The apex beat had been situated 2.5 centimetres (one inch) outside the right nipple line. On this day the patient had been admitted to the Adelaide Hospital.

On admission the patient had been very thin and weak and his respiration had been short and grunting. Signs of fluid had been present at the left base together with a large pneumothorax which had displaced the heart so that the apex was situated five centimetres (two inches) to the right of the sternum. The patient's temperature had been 40° C. (104° F.). An attempt had been made to aspirate the fluid at the base, but thick pus had been found and the needle had become blocked.

Dr. H. S. Newland had seen the patient in consultation, had examined him carefully and had decided that resection of a rib was not indicated at the time. That night the breathing had become very distressed and the patient seemed to be *in extremis*. Under local anaesthesia a large trocar had been inserted into the eighth intercostal space in the posterior axillary line. About one hundred and fifty cubic centimetres (five ounces) of pus and a quantity of gas had been evacuated. The patient's condition had subsequently been much improved. Free drainage had occurred, but on August 13 and 14, 1925, his temperature had again become high. This had continued till September 9. The patient's temperature had been of the hectic type, though his appetite and so forth were very good.

In view of the state of the temperature it had been decided to remove a piece of rib. This had been done under ether anaesthesia and from then onwards the patient had steadily improved. He had been discharged from hospital on October 2, 1925, looking healthy and having put on a lot of weight. The pneumothorax had still been present on the left side, though the wound was quite healed.

At the time of demonstration the patient was having regular breathing exercises with Wolff's bottles and the air entry was apparently improving. The heart was seen on examination to be in normal position.

A series of skiagrams was shown. One taken on August 8, 1925, revealed a large hydropneumothorax on the left side with considerable displacement of the mediastinum to the right and compression of the right lung. The left lung was collapsed and there was a small irregularity in its outline in one place suggestive of the presence of an abscess.

In a skiagram taken on August 17, 1925, the fluid was seen to have practically disappeared. The heart was nearer the middle line and the collapsed lung was evident.

A skiagram taken on September 21, 1925, revealed a large pneumothorax with very little expansion of the lung. In a skiagram taken on October 28, 1925, increased expansion could be seen, though a large pneumothorax was still present.

It was suggested that the cause of the condition was a pulmonary abscess following the pneumonia and that the pneumothorax had resulted from a breaking down of the abscess and its communication with the pleura and a bronchiole. The child had not developed any asymmetry of the chest or scoliosis, but the ultimate outcome was still in doubt.

Diploma of Botanic and Naturopathic Practitioners.

Dr. A. A. LENDON showed a copy of the diploma of membership of the Association of Botanic Medical and Naturopathic Practitioners, South Australia. This was the Association of so-called "nonconformist" medical practitioners who had recently formed a deputation to the Chief Secretary, requesting him to introduce a bill into Parliament to enable them to be registered as a body, entitled to practice in their own way and to give them power to grant certificates of health and of the cause of death. The Chief Secretary's reply had been sympathetic and contained an allusion to the fact that the eminent Mr. Spahlinger was not a regular practitioner. Dr. Lendon pointed out that the bulk of the document consisted of what was termed the "Herbalists' Charter," being a reproduction of the original quaint language of an Act of Henry VIII, entitled: "An Act that Persons, being no Common Surgeons, may Administer Outward Medicines." It was stated that this Act had not been repealed.

Protein Therapy in Ophthalmic Practice.

Dr. HERBERT J. SHORNEY read a paper entitled: "Protein Therapy in Affections of the Eye" (see page 177).

Dr. R. H. PULLEINE in thanking Dr. Shorney for his paper said that he had been using the therapeutic measures described by Dr. Shorney since 1922. These measures had not attracted the attention of ophthalmologists very widely to judge from the paucity of references to the subject in the literature of the preceding four years. The mode of action of the injected material was in doubt, whether it was due to protein contained in the milk or the protein liberated by the body at the site of injection. The experience with turpentine showed this. The only body in turpentine allied to protein was a small amount of cholesterol. The use of the method in practice without laboratory conveniences or controls and the simultaneous use of other therapeutic agents made it difficult to pass judgement on the value of milk. Dr. Pulleine's feeling, however, after a long experience of eye disease was that protein therapy had a beneficial influence on sluggish processes in the cornea and anterior chamber. The injections were not followed by any pain.

Dr. J. R. MUIRHEAD thanked Dr. Shorney for his interesting and instructive paper. He considered that anything which would act as a *vis a tergo* in such a condition as gonorrhoeal ophthalmia, was a distinct advance. He inquired whether the conditions depending on absence of vitamins, such as *xerosis conjunctiva*, were aided by milk injections. So far, he had not used them in his own practice.

In his reply Dr. SHORNEY said that Dr. Pulleine had raised an interesting point as to the precise action of the protein injections. Was it the protein itself or some product of irritation or even of necrosis of the tissues at the point of injection which caused the reaction, or was it some blood at the site of injection which was responsible?

He also pointed out that a majority of ophthalmologists abroad considered that protein treatment was to be used only in acute cases. Others gave milk or other injections in chronic conditions also.

Measles.

Dr. RAY HONE read notes of cases of measles treated at the Adelaide Hospital during the recent epidemic.

THE INAUGURAL MEETING OF THE ORTHOPÆDIC SECTION OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held in the B.M.A. Building, East Melbourne, on July 17, 1925.

Election of Office Bearers.

The following office-bearers were elected:

Chairman: DR. W. KENT HUGHES. Honorary Secretary and Treasurer: DR. MERVYN STEWART (also representing the Melbourne and Children's Hospitals).

Committee: DR. C. GORDON SHAW (representing Saint Vincent's Hospital), DR. H. C. COLVILLE (representing the Alfred Hospital), DR. H. C. TRUMBLE (representing the Austin Hospital).

Objective of the Section.

DR. W. KENT HUGHES, on taking the chair, thanked the members present for the honour they had conferred upon him in electing him as first Chairman of the Section. He said that the study of orthopædics as a special science and a special branch of surgery was at last receiving the recognition that it deserved.

The formation of the Section represented the realization of one of his greatest hopes.

The following were agreed to as the avowed objects of the Section:

1. To advance the study of orthopædics.
2. To hold meetings for discussion on orthopædic problems.
3. To study the results of orthopædic work.
4. To educate the medical profession and the public to the necessity for the establishment of an orthopædic hospital.
5. To advocate the establishment of orthopædic clinics in general hospitals.
6. To develop the art of manipulation of orthopædic apparatus.
7. To accumulate a library of orthopædic literature.

Tendon Transplantation.

DR. C. GORDON SHAW then opened a discussion on the subject of tendon transplantation.

The transplantation and suture of tendons was distinguished by an element of uncertainty. It would be a good thing if tendon division was followed by ordinary movement in all cases, but in many it was not. In many of the results of operation there was very qualified success and there was a lot of failure. The factors that would decide which cases would be successful were not very clear. On the one hand were cases of simple division of a tendon followed by suture in which return of function occurred very slowly, if at all. On the other hand division of certain tendons was followed by rapid recovery and restoration of function even when it was not wanted. So it was apparent that there was a good deal not known about division of tendons and much less about tendon transplantation.

A point of very great interest was the question whether the function of a muscle depended on an intact reflex nervous arc. He was inclined to think that this was a very big factor. The afferent impulses were apt to be interfered with when a tendon was divided and put somewhere else and failure of the muscle to do the new work expected of it might depend on the fact that the nerve reflexes which are responsible for maintaining the tone and nutrition of a muscle, were interfered with by the operation of transplantation. There was no actual proof of the truth of this suggestion, but there was some evidence in favour of it.

Other factors which counted in the ultimate result of the operation of tendon transplantation were an absolutely faultless technique and very careful selection of cases for operation and these factors were under the control of the surgeon. Whether perfect technique would guarantee a good result was uncertain. Reeducation as a factor in the final success of the operation was a matter of the utmost importance.

The region operated on bore largely on the question of prognosis. The problem varied for instance as between

operations on the hand and on the foot. In the leg the function of the muscles was to maintain the erect posture and to perform the movements of walking and running. In the hand the muscles were concerned in the performing of skilled and varied movements. So that when the attachment of a muscle was altered in the leg, reeducation was comparatively simple, but in the hand it was a difficult and prolonged process.

Another thing noticed in results of tendon transplantation was that the muscles which were transplanted to a great extent lost power and were very weak. This should be borne in mind when transplanting one or more muscles which normally were only moderately strong, to another position where they were intended to replace powerful muscles, as in transplanting the peronei and *tibialis posticus* muscles to replace the paralysed *gastrocnemius*. The peronei were weak muscles to commence with and the act of transplanting them made them much weaker.

The conditions for which tendon transplantation might be done, included injuries to nerves which could not be repaired by end-to-end suture or in which regeneration did not follow repair; infantile paralysis in which recovery had not ensued with good treatment in twelve to fifteen months and a small group in which the muscles were destroyed by injury. These were the chief conditions in which tendon transplantation was useful. Other troubles for which the operation had been performed and which had been recorded, were weakness of certain muscles, as in flat foot, spasmodic contraction of muscles and spastic paraplegia. Except in very few instances, however, the operation was not a useful one for these conditions.

Factors which were to be considered before the operation was performed were first and most important the age of the patient. Sir Robert Jones considered the best age was from five to seven years and did not operate before the age of five. Mr. Shaw considered seven was not a suitable age and that the best results are obtained in patients operated on between the ages of twelve and eighteen years. Age was a most important matter because reeducation was so large a factor and children operated on before the age of twelve could not be reeducated except as a very long business and certainly not as out-patients. At this age reeducation could be carried out successfully only in a cripple hospital over a period extending into many months or years. The best age, therefore, to choose in which to operate was certainly not before twelve and perhaps at fourteen or fifteen the surest results were obtained.

All preexisting deformity must be corrected before transplanting a tendon. It was quite useless to transplant in order to correct a deformity. It was advisable in that connexion to maintain the joints in as freely movable a condition as possible. He had seen tendon transplantation done in the presence of stiff joints. It was quite ridiculous, but nevertheless it had been done.

The transplanted muscle should be of sufficient strength to carry out the function of the muscle which it replaced. Certain transplantations were described in which portions of the trapezius or the *pectoralis major* were used to replace the deltoid; or of the *tibialis anticus* or *peroneus brevis* to replace the *gastrocnemius*. These were doomed to failure, as the transplanted muscles were too weak and inefficient to perform their intended duty. In the operative technique it was necessary to maintain as straight a course for the transplanted tendon as possible. Curves reduced the strength of a tendon. In securing a straight course the secret of success lay in making an extensive incision, twenty, twenty-five or thirty centimetres (six, ten or twelve inches) in length if necessary and freeing the tendon well up to the muscle belly and detaching portion of the belly of the muscle from its attachment to bone.

Another point in technique was whether the transplanted muscle was to be inserted into tendon or bone. The latter method undoubtedly gave the best results. The insertion of the transplanted tendon into bone was accomplished either by stripping up the periosteum and a layer of bone at the point of insertion and making the insertion under a bridge of periosteum and bone or by

making a groove in the bone with a chisel and suturing periosteum over the tendon implanted in the groove or if the tendon was long enough, by pulling it through a hole drilled in the bone. As a rule the tendon was not long enough for this latter procedure. In some instances none of these methods was practicable, for example, in transplanting tendons of the wrist and hand.

Another useful point in technique was instead of dividing the tendon at or near its insertion, to strip it from its attachment, taking with it periosteum and a thin scale of bone. The tendon was thus kept intact and possibly its afferent nerve supply was less interfered with than if it was divided from its insertion.

Another important matter was the track through which the implanted tendon was made to pass. There were generally two methods to follow. The track through subcutaneous fat was always available and easily made with long fine forceps pushed through in line with the tendon which was pulled through the tunnel thus constructed. This method apparently gave quite a good sheath and had its uses.

Transplantation of the synovial sheath with the tendon should always be done, if a tendon sheath existed. This method was preferable whenever it could be performed.

In making a new track for the tendon it was most important that any opening through the deep fascia should be very large, so that no adhesion could occur between the tendon and the fascia. If adhesions occurred, the action of the tendon was hampered. It was often found that a transplanted tendon was anchored to the deep fascia and that it was therefore quite immobile. Artificial coverings for the transplanted tendons had been used, but Mr. Shaw had not tried them, as this method did not appeal to him. It was probable that the artificial membranes were transformed to scar tissue and this made for worse adhesions. He understood that Trotter's method of ensheathing nerve trunks in free fat was being abandoned.

It was necessary to remember that all scar tissue present in the track through which the tendon was to be made to pass, must be completely excised.

In order to insure a straight course for the transplanted tendon and to move it with its synovial sheath it was necessary to make big incisions and he invariably did this. Alternately a number of small incisions might be made, the tendon being pulled through beneath the bridge of skin so formed. This method was not so good as a long incision, which permitted transplantation of the tendon with its sheath, to insure a straight course and to obviate the twisting of the tendon.

Perhaps the most important operative factor after those already mentioned was to suture the tendon in position under some tension. The limb should be held in the over-corrected position and the tendon sutured while it was thus held.

For example in transplanting the tendon of the *peroneus longus* muscle to the scaphoid bone for *valgus* deformity the foot should be held in the extreme *varus* position and dorsiflexed and maintained thus.

Similarly when the flexors of the wrist were transplanted to the dorsum of the hand for musculospiral paralysis, the hand should be extended whilst the suturing was being done. This was a most important matter, but it was difficult to be sure about it.

After-treatment consisted in immobilization for three weeks and reeducation of movement should be gradually started, the amount of function being increased as the muscle could bear it. No overstrain should be put on the muscle. It sometimes happened that the tendon transplant was going along satisfactorily and then owing to neglect on the part of the surgeon or the patient the tendon was strained and the transplanted tendon lost power.

For example the hand in the operation to correct the effects of musculospiral paralysis should be kept in a cock-up splint until the muscles gained sufficient power. If the splint was left off, the transplanted tendon was down for some time and it required a lot of work to coax it back again.

In patients operated on for talipes the foot should be fitted for a time with an iron brace, otherwise the operation was rendered quite useless. Mr. Shaw referred briefly to tendon transplantation in special regions.

For shoulder disabilities, tendon transplantation was a useless procedure. For paralysis of the deltoid muscle arthrodesis of the shoulder joint was the best corrective. Transplantation of the trapezius or *pectoralis major* had no value. The operation might be done when paralysis of certain nerves existed. Mr. Shaw had performed the operation in a good many cases of musculospiral paralysis in which the tendon of the *pronator radii teres* was transplanted to the *extensor carpi radialis longus et brevis*, the *flexor carpi radialis* to the extensors of the thumb and index finger and the *flexor carpi ulnaris* to the extensors of the third, fourth and fifth fingers. Sometimes the operation was quite successful with fairly good restoration of function to the affected hand. He could not record a case quite so successful as that reported by Mr. Murray whose patient returned to active service in France, but his results were the provision of useful hands capable of light work.

In paralysis of the ulnar nerve tendon transplantation was not called for. Here the hand was fairly useful, not much disability being present. The problem in paralysis of the median nerve was a difficult one. If the median nerve only was involved, the extensors of the wrist could be transplanted to the flexor surface, for example, the *extensor carpi radialis longus* tendon to the tendon of the *flexor longus pollicis* muscle and the *flexor profundus* tendon of the little finger, which might be in part crippled by the ulnar nerve, might be transplanted to the index finger. In this way function might be improved slightly.

In a case in which both the ulnar and median nerves were destroyed, the tendon of the *extensor carpi radialis longus* had been transplanted to the *flexor longus pollicis*, and the *extensor carpi ulnaris* to the index and middle finger tendons. The patient had been able to hold articles between his thumb and index finger, but it was not an operation from which much could be expected.

In regard to the hip, only one operation was applicable. This was the transplantation to the upper part of the femur of the *tensor fasciæ femoris* for abductor paralysis and paralysis of the *gluteus medius*. The operation was a very important one in its application to disabilities of movement in the knee joint, as in so many cases of infantile paralysis, the *quadriceps extensor* was affected. The orthodox operation in this case was the transplantation of the *biceps* on the outer side and the *semi-membranosus* or the *sartorius* on the inner side, into the patella. It was necessary to transplant a tendon on each side so as to prevent a pull of the limb to one or other side. Mr. Shaw had also effected the transplantation of the *tensor fasciæ femoris* to the patella and the *adductor magnus* to the patella, in each case with some improvement. In observing the results of these operations it had been seen that in no case was voluntary extension of the leg accomplished. Cases in which the result was effected might exist, but so far he had not seen it. The improvement gained was in the increased stability of the knee joint, the knee being capable of being kept stiff in the upright position. The increase in the stability of the knee was very useful and the operation was therefore worth doing.

Most of the operations were done for correcting infirmities of the foot and ankle joint, for example, the transference of the tendon of the *peroneus longus* to the scaphoid or of the *extensor proprius hallucis* to the scaphoid for *talipes valgus*. It was an important point if the latter tendon was used, to fix its distal end to the tarsus to prevent the occurrence of dropped toe which so often ensued. For *talipes varus* the *tibialis anticus* was transferred to the base of the fifth metatarsal bone. For *talipes calcaneus* no tendon transplantation operation was of value. In the classical operation described for this deformity, the transference of the tendons of the *tibialis anticus* and *peroneus brevis* to the *os calcis*, the recovery of function was not enough to prevent a recurrence of the

calcaneus deformity. He preferred to arthrodese the ankle joint.

In briefly reviewing the results of operations, Mr. Shaw said he could not be very encouraging. There were a large number of failures and a considerable number in which success was only partial. The good results obtained were, however, very gratifying. Some of the results were very disheartening. He would like to ask if the operative technique could be improved or was the operation itself fundamentally wrong.

DR. H. DOUGLAS STEPHENS said that his experience in disabilities of the upper limb was a limited one, but he had operated on a considerable number of patients whose lower limbs were affected. At the Children's Hospital there were very few cases in which the tendons suffered from injury and infantile paralysis rarely affected the muscles of the upper limb. His work in correcting the effects of paralysis of the lower limb had not led him to take quite so pessimistic a view of tendon transplantation as Mr. Shaw held. In private practice he always approached a tendon transplantation with a certain amount of trepidation, as he never knew if success or failure was to follow the operation. Quite strong muscles were removed and transplanted and were expected to hold a deformed part in its correct position. It was because too much was expected of the transplanted muscle that results were so very poor. He had, however, occasionally seen very brilliant results follow the operation. If he was asked for an opinion on a private patient, he always felt that if he could offer a reasonable prospect of improvement without operation, it was better not to operate, as if the operation was not successful, the foot was left in a weaker condition as a result of surgical intervention.

Mr. Shaw had said that if the paralysis had not existed for more than twelve to fifteen months, he would not do a tendon transplantation. Dr. Stephens always followed Lovett in the procedure. Lovett never operated before two years had elapsed from the onset of paralysis and he was inclined to wait even longer than two years. He rarely operated on children under the age of eight years, as their capacity for reeducation of muscles was not developed before that age. Another reason was that the operation of arthrodese should not be performed under the age of eight and he held the view that an arthrodese should always accompany a transplantation. Mr. Shaw had said that a tendon transplantation should not be done in the presence of stiff joints. Dr. Stephens agreed with this dictum, but nevertheless it was often advisable to stiffen joints before transplanting tendons, for example in transplanting the *peroneus longus* tendon to the scaphoid it might be advisable to arthrodese the talonavicular joint.

In regard to technique he liked the Lange technique of lifting a piece of bone with the tendon, but if this was done, it was difficult or impossible to pull it through a tendon sheath and thus it was impossible to observe the Bresalski-Mayer method and the surgeon was forced to resort to subcutaneous tunnelling.

The method of removing the synovial sheath *in toto* was not a good one in transplanting long tendons, but not many possessed a tendon sheath. If the *peroneus longus* tendon was transferred with its sheath to the median border of the foot in order to correct a paralytic valgus deformity, a long incision was required on each side of the leg. He preferred to pull the *peroneus longus* tendon out from its attachment to the cuboid bone and transplant it by the Bresalski-Mayer method through the sheath of the *tibialis anticus* or in a tunnel of subcutaneous fat.

With regard to suturing tendons in position Dr. Stephens had had an experience in cases of disability of the hand similar to the case quoted by Mr. Shaw in which the transplanted tendons were sutured to the lower ends of the paralysed tendons, but in the past he had sutured the tendon to paralysed tendons and had found that the paralysed tendon stretched and in about eighteen months the deformity had recurred.

He would like Mr. Shaw to state what suture material he used in suturing tendons together. Dr. Stephens was accustomed to use fine unchromacized catgut, but

sometimes he used silk or chromacized catgut and more recently had used strips of fascia. An objection to this method was that in children it was difficult to obtain the fascial strips without making extra incisions and that therefore the suture material was too short. He would like to know a better material than unchromacized catgut as it was too stiff.

The refunctioning of the limb operated on was the greatest need and required intelligent massage and reeducation. In the absence of these the transplanted tendon might be stretched beyond repair. Masseurs knew little about muscles and he would like the Orthopaedic Section to supply a remedy for the need.

In cases in which the *extensor hallucis longus* was used as a transplant instead of fixing the distal end to the tarsus, he preferred to suture it to the medial tendon of the *extensor longus digitorum*.

DR. A. S. M. TYMMS said that he did not hold the operation of transplantation of tendons in very much favour, but he had nevertheless attempted it in several cases. All of these, except two, were in private patients and he had experienced the same difficulty in giving a prognosis as had been mentioned by Dr. Stephens. He had found that the loss of power in the transplanted muscle was most striking, it being weaker than might be expected even when there had been no overstretching. Hence he considered that it was most important to maintain overcorrection and to commence the reeducation of the limb without the presence of any slackness in the transplanted tendon.

He had been very interested in Mr. Shaw's suggestion of the possible influence on the result of the operation of interference with the nerve reflex arc, as it had not occurred to him that this might be a factor in prognosis.

Dr. Tymms thought that the time at which tendon transplantation should be considered, should not be earlier than from eighteen months to two years after the onset of paralysis and he believed that even a longer period might be allowed. In many cases of infantile paralysis some recovery might be obtained by persisting for the longer period. With regard to the age for operation Mr. Shaw had expressed a preference for twelve years, because the factor of reeducation was such an essential one. Dr. Tymms, however, considered that the educative factor was better the younger the patient, as the mind was then more receptive. This of course involved greater care in the training of educative exercises and masseurs should not be given charge of them.

The educative treatment should not be taken out of the surgeon's hands until he was satisfied that the result of the operation was a good one.

MR. FAY MACLURE stated that he had a very small experience of tendon transplantation, because he was decidedly unwilling to operate on a sound muscle and transplant it, unless he could be sure of improving the affected limb. He invariably tried other methods of treatment before resorting to tendon transplantation, but had at times been forced to use this procedure, as in paralysis of the musculospiral nerve, to restore the function of the hand.

Mr. Shaw's suggestion of interference with the nerve reflex arc, as a cause of wasting of the muscle and an explanation of the failure in certain cases was ingenious, but Mr. MacLure would like to suggest that the reason why the muscle operated on failed to do its work lay in the fact that it was not used for several weeks.

Interference with the nutrition of the transplanted tendon had been advanced as a cause of failure, but he was unable to accept this hypothesis, as tendon tissue required so little nutrition. Even silk might be used as an artificial tendon and sometimes acted as such very well.

In discussing the technique of the operation Mr. Shaw had stated that he put the muscle in the fullest degree of tension, but to the speaker this did not seem right. He quite agreed that the new point of attachment should not be lax, but full stretching interfered with the operation and courted failure. He believed that the tendon should be fixed in its new anchorage half-way between full slack and full tension.

Dr. Stephens had raised the question of suture material. Mr. Maclure had some experience in tenoplasty and would say that in suturing, the smaller the amount of damage done to the tendon, the better the result obtained. There should be as little separation of the tendon fibres as possible. So it was better to avoid a coarse material like catgut, more especially because to use it required a large needle and this itself damaged the tendon. He used the finest silk with the finest needle, suturing in multiple threads, lacing them in and out and bringing the end out at the centre of the cut end of the tendon. He regarded the bringing out of the suture at the face of the cut rather than at the side of the tendon as important, as the latter method was more likely to cause adhesions to neighbouring tissues. He related the history of a patient on whom he had operated for paralysis of the musculospiral nerve and for whom all hope for recovery of the nerve was lost. The tendon of the *flexor carpi radialis* and *palmaris longus* had been implanted into those of the paralysed extensors of the thumb and fingers and the patient who was a dairy farmer, had been enabled to resume his work in full.

DR. FLECKER considered that the nutrition of the muscle operated on was a matter of some importance from the point of view of repair and he made the suggestion that nutrition might be maintained and the possibility of repair improved, if the severed and sutured tendons were exposed to treatment by ultraviolet radiation.

DR. R. M. DOWNES said that he had only a small experience of tendon transplantation and it had been limited to operation on the foot in infantile paralysis. He was very careful of attempting this treatment of the deformities, because a perfectly good muscle was placed in a position where it might completely fail. He had derived very much benefit from Mr. Shaw's temperate and able treatment of an admittedly difficult subject.

MR. W. D. G. UPJOHN said that he was in agreement with Mr. Shaw with regard to the age at which the operation should be performed. It was impossible, however, to lay down any definite rule, as so much depended on the intelligence of the child. Very many patients had a poor idea of the sense of the position of a limb and of how to use a muscle, whilst others were quite good and these were the ones in which the best results are obtained.

Mr. Upjohn had had more success in his work, not when he used a perfectly good muscle to replace a paralysed one, but rather to supplement the action of a partially paralysed and feeble muscle. For example, when the dorsiflexors of the ankle were weak, he transplanted the *extensor longus hallucis* into the tarsus. This tendon did quite well in cases of dropped foot, but was not strong enough to replace the big *gastrocnemius* muscle. Similarly the transplantation of the hamstring tendons was useful when the quadriceps was partly paralysed. Quite frequently there was a gradual resumption of power on the part of the quadriceps muscle. He therefore regarded tendon transplantation as being most useful when it was designed to supplement the action of a muscle, which was partly paralysed, but still retained some power of recovery.

As regards technique he was more satisfied with wide exposure of muscle and tendon through a large incision and of performing the transplantation so as to see the whole course of the tendon. In this way he prevented twisting and obviated abnormal points of attachment in its new course. It was important during transplantation in order to prevent over drying of the tendon to expose it to the air as little as possible.

When it was not possible to effect a new anchorage by an osseous insertion and sound tendon had to be attached to paralysed tendon, bad results were apt to be due to over stretching, not of the tendon, but at the point of union. A fibrous union would always stretch, no matter how sound the scar. So when he was unable to effect an osseous insertion, he preferred to fray the cut end of the paralysed tendon into strands and darn it spirally into the upper end of the transplanted tendon. Since adopting this method he had not seen any evidence of stretching at the point of union.

In suturing tendons he was careful to avoid trauma as far as possible and used a very fine needle and ophthalmic silk worm gut with multiple sutures. These added little to the bulk of the tendon. This material could be cut very close to the knot and gave a very satisfactory union.

DR. MERVYN STEWART said that his experience of the operation was limited to two cases. He had found difficulty when moving the tendon with its bony attachment in getting it to pass along its new track through a tendon sheath and also in placing the new attachment without undue tension. Mr. Shaw had said he believed in securing a fair amount of tension. Mayer had stated that a normal tendon should be under a tension of zero while the patient was anaesthetized, but Dr. Stewart had found that the tendon was always under a *plus* tension even in its new position. With regard to the question of operating on patients who had suffered from infantile paralysis within twelve to fifteen months, there seemed very little doubt that muscles apparently hopelessly paralysed were capable of some degree of recovery if put at rest. Cases were known to him in which there was return of muscle power, even when the muscles had been over-stretched for five or six years, if they were put in a position of over-correction.

He agreed that transplantation of the *peroneus longus* tendon to act for the *gastrocnemius* was a useless procedure, but the fact remained that Mayer had published cases and shown photographs in which the operation had been done and in which the patient after suffering for four or five years from *talipes calcaneus*, could stand on tip-toe. He suggested that the putting of the foot at rest in the over-corrected position resulted in the recovery of power in the *gastrocnemius* muscle in this case. He believed arthrodesis should always be done in *talipes calcaneus*. Before any operation was done, the question should be asked, was the patient capable of recovery without such a radical procedure.

DR. W. L. POTTER said he had been more interested in the postoperative condition of paralysed limbs treated by means of tendon transplantation. He asked Mr. Shaw if he attached importance in the case of musculospiral paralysis to the hyperextended position in which the hand was placed. Dr. Potter, in his work in connexion with the Repatriation Department had seen many cases of claw hand and he regarded those with hyperextension at the wrist joint as most unsatisfactory. He thought that something more than mere incidental factors was associated with the failure in these cases. The transplanted muscle in many cases seemed to him to have become tough, leathery and fibrous, suggesting a similar condition to that found in Volkmann's ischaemia. He wondered whether in these cases the hand had been left slack and as a result of some trauma degenerative changes had occurred.

He would like to know exactly what the surgeon expected the transplanted muscle to do. Did a transplanted flexor muscle become intrinsically an extensor? He had been very disappointed in observing the poor functional results of the operation; unless it was possible to educate a transplanted flexor muscle to perform extensor functions, the operation could not be called a success.

He had asked himself what could be done with the dorsal group of paralysed muscles? Could the operative technique be improved? Was it possible for some of the tissues of the paralysed dorsal muscles to be carried over and sutured to the triceps or for the triceps to be sutured to the extensors? Then if this were accomplished, flexion at the elbow joint would extend the wrist and this would avoid mutilation of the sound flexors. He would like Mr. Shaw to explain the reasons for his comparatively pessimistic view of the utility of the operation, at least with regard to operations on the upper limb.

He would like to learn more precisely and in more detail what was meant by reeducation. He very strongly held the view that these patients should never leave the surgeon's care and should not be handed over to masseurs who had little knowledge and less discrimination. In his opinion very little physiotherapy was needed.

MR. KENT HUGHES said he had been an interested listener to the discussion. He had never held an optimistic view as to the results of tendon transplantation and for the preceding fifteen years had had very little experience of the operation. He had certainly begun as an enthusiast, but had gradually abandoned the procedure. He had been interested to hear Dr. Potter's experiences in the after-treatment of cases operated on for the relief of musculo-spiral nerve paralysis, as he thought that tendon transplantation had its clearest indications in this field.

He considered that the keynote of success in Mr. Shaw's cases was the rectification of deformities and the more he carried this out, the further away he would get from transplantations. In Mr. Hughes's opinion Sir Robert Jones's operation for the relief of *calcaneus* deformities was absolutely useless, as one could not possibly expect a transplanted *extensor proprius hallucis* to have any effect in overcoming *talipes calcaneus*.

Most of Mr. Hughes's work had been done on the paralysed lower limb. *Valgus* deformity of the foot called for transplantation of tendons more than any other defect, but rectification of the *valgus* deformity should be done before transplantation was considered. It was not easy and required frequently tenotomy of the peronei. It had to be remembered in the case of a paralysed muscle that there was always some hope of recovery of power unless fatty degeneration was present in the muscle. It was never too late for some recovery in a paralysed muscle, so long as the muscle remained thin and there was no fatty degeneration present. In cases of *talipes equinus* and *calcaneus* he had seen some recovery of power even after thirty years. He was therefore very strongly convinced that the surgeon ought to use all other method of treatment before resorting to tendon transplantation.

He had been horrified at the way in which some surgeons seemed to play about with the *peroneus longus* and the *extensor proprius hallucis*. The *peroneus longus* especially was so useful a muscle and he had yet to be convinced that interference with it did not further increase the damage already present.

He had seen very few cases in which he had considered it advisable to resort to tendon transplantation. The longer he persevered with other measures, the more convinced he was that transplantation should be postponed.

For instance, in *talipes calcaneus* it was of no use to transplant until the *os calcis* was in proper position and the *cavus* defect was removed. There must be free division of plantar tissues and ligaments holding the *os calcis* and it might even be necessary to remove a bridge of this bone. Even then a transplantation should not be performed unless the surgeon was fully convinced that there was no power left in the *gastrocnemius*. He considered that of all the muscles of the leg there was a greater prospect of recovery in the paralysed *gastrocnemius* than in any other, despite the very unfavourable position of the resulting *talipes calcaneus*.

He considered in the question of technique that the result of transplantation was not very good unless bone was inserted into bone. Suturing should be done with fine silk and fine needles side to side. Regarding after-treatment he would like Mr. Shaw to try early movement and not to immobilize for so long a period. In all tendon work the earlier the movements, the better the results. He even commenced moving the limb passively on the day after the operation, with active movement on the third day. Finally except in cases of paralysis of the *quadriceps extensor* Mr. Hughes said he was never likely to do a tendon transplantation again and he would advise, before resort to the operation, that deformities be removed and the overstretched muscle be allowed to recover. He considered that the aesthetic was always better than the practical result.

MR. SHAW in reply said he would like to emphasize that the value of tendon transplantation lay in a better balancing of the remaining power of the limb. It was not merely a matter of taking a perfectly healthy tendon and transplanting and thus running the risk of adding the loss of this muscle to that of the paralysed muscles.

An opposing tendon was taken and even if some of its strength was diminished, the resulting muscle power was better balanced, although the total power was less.

He had been very interested in Mr. Upjohn's idea of the reinforcement of weakened muscles, with subsequent recovery of power in the paralysed muscle. He also had observed this result.

He had perhaps not expressed himself very clearly in stating that a period of twelve to fifteen months should elapse before operation might be considered. If there was absolutely no recovery of power in a paralysed muscle after twelve to fifteen months of adequate treatment, then tendon transplantation might be considered, if the age of the patient was the optimum one, namely twelve years or more. If there had been some degree of recovery then the treatment should be continued.

Dr. Stephens had suggested that the adoption of long incisions for complete exposure would necessitate the making of several long incisions, but this was not necessary, because flaps of skin could be reflected and most of the work done through one big incision, a smaller opening being made at the site of transplantation.

He had also said that in suturing tendon to tendon there might be stretching of the paralysed tendon. Mr. Shaw did not know if this occurred and he thought that it was difficult to be sure of it. Very slight alterations in the length of a tendon had big results. His method of suturing tendon to tendon was to split the paralysed tendon and to pull the transplanted tendon through the aperture thus made, suturing it into position with the finest chromicized catgut. He used multiple sutures of fine gut in preference to a few thick catgut sutures. He liked fine silk equally well, but it was essential to use very fine suture material and needles.

Dr. Tymms had suggested that patients operated on at an age younger than twelve years, were more capable of reeducation, but this could be true only if the children were under constant care. His own best results had been seen in the case of adults. For example, in a man with paralysis of the peronei he had transplanted the *tibialis anticus* tendon to the base of the fifth metatarsal bone; in three or four weeks good movement had been present and ultimately the patient had become a league footballer.

Mr. MacLure thought that disuse rather than any interference with the nerve reflex arc explained the failure of the muscle operated on to do the work expected of it. Mr. Shaw said that he was very sceptical about the effects of disuse as a cause of muscle weakness. A limb might be kept at rest for months with very little wasting or stiffness of joints resulting.

Dr. Potter had referred to the question of the tension under which tendons were sutured. As a matter of practice it was impossible to suture a tendon which was under excessive tension. If the wrist was held in the hyper-extended position while the tendon was being sutured, it was sufficient to suture the tendon so that when the wrist dropped the tendon became tense. It was quite wrong to grip the end of the tendon with forceps and pull it forcibly to its point of attachment, the tendon should always be sutured whilst the limb was held in the over-corrected position.

With regard to the results of operation for musculo-spiral paralysis. Mr. Shaw rather thought that Dr. Potter had all the failures transferred to his care, the patients with successes having gone home. He quite agreed that many failures occurred, but there were also many successes.

The deformity resulting in the unsuccessful cases might be due to keeping the fingers in the overextended position for too long a time. Active and passive movements should be commenced fairly early and the nutrition of the muscles must be maintained.

Mr. Shaw was interested in the comments on the discussion advanced by the Chairman. He regarded it as essential to keep a sane outlook on the question of tendon transplantation and to use the utmost endeavour to obtain the greatest possible amount of recovery in the paralysed muscles before resorting to the operation.

With regard to Mr. Hughes's suggestion on early post-operative movements he was rather afraid of the sutures pulling through or of the point of union stretching as a result of applying movements at too early a date and so perhaps it was possible that he overdid rest in the zero position and this might be a factor in his failures.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Renou, Cecil Ashley Harold, M.B., B.S., 1925 (Univ. Melbourne), Caulfield.

McInnes, Ian Donald, M.B., B.S., 1925 (Univ. Melbourne), Thornbury.

Obituary.

ROBERT STOPFORD.

WE regret to announce the death of Dr. Robert Stopford which occurred at Balmain, Sydney, on January 28, 1926.

Medical Appointments.

THE undermentioned have been appointed Resident Medical Officers at the Adelaide Hospital:

Dr. Harold Henry Appleby, Dr. William Blackney (B.M.A.), Dr. Harry Leonard Chester (B.M.A.), Dr. Melville Ernest Chinner (B.M.A.), Dr. Alfred Sydney de Bohun Cocks, Dr. Malcolm Turner Cockburn, Dr. John Francis Cramp (B.M.A.), Dr. Robert Qwen Fox, Dr. Reginald Hewgill Hamilton (B.M.A.), Dr. Reginald Denys Hornabrook, Dr. Henry Gordon Prest, Dr. Gordon Wearing Smith (B.M.A.) and Dr. William Delano Walker (B.M.A.).

Dr. J. B. Hawkins and Dr. T. L. Anderson (B.M.A.) have been appointed members of the Board of Management of the Perth Hospital.

Dr. B. P. Cass (B.M.A.) has been appointed District Medical Officer and Public Vaccinator at Corrigin, Western Australia.

Dr. Clarence George Godfrey (B.M.A.) has been appointed Deputy Inspector-General of the Insane, Victoria.

Dr. Albert Curtis (B.M.A.) has been appointed Acting Medical Superintendent of the Hospital for the Insane and the Receiving House, Ballarat, Victoria.

Dr. Henry Gordon Prest and Dr. John William Rollison have been appointed Resident Medical Officers at the Adelaide Hospital.

Dr. Joseph Bernard Dawson (B.M.A.) has been appointed a Member of the Board of Optical Registration, South Australia.

Dr. William Christie has been appointed Medical Inspector of Schools in the Education Department, South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xx.

ALEXANDRIA MUNICIPALITY, EGYPT: Chief Bacteriologist.

LAUNCESTON PUBLIC HOSPITAL: Surgeon Superintendent.

LAUNCESTON PUBLIC HOSPITAL: Junior Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Ceduna, Wudinna (Central Eyre's Peninsula), Murat Bay and other West Coast of South Australia Districts.
WESTERN AUSTRALIAN: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

- FEB. 16.—Tasmanian Branch, B.M.A.: Council.
FEB. 16.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
FEB. 23.—New South Wales Branch, B.M.A.: Medical Politics Committee.
FEB. 24.—Victorian Branch, B.M.A.: Council.
FEB. 25.—South Australian Branch, B.M.A.: Scientific Meeting.
MAR. 2.—Tasmanian Branch, B.M.A.: Council.
MAR. 2.—New South Wales Branch, B.M.A.: Ethics Committee.
MAR. 3.—Victorian Branch, B.M.A.: Branch.
MAR. 3.—Western Australian Branch, B.M.A.: Council.
MAR. 4.—South Australian Branch, B.M.A.: Council.
MAR. 5.—Queensland Branch, B.M.A.: Branch.
MAR. 9.—Tasmanian Branch, B.M.A.: Branch.
MAR. 9.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 11.—Victorian Branch, B.M.A.: Council.
MAR. 12.—Queensland Branch, B.M.A.: Council.
MAR. 15.—New South Wales Branch, B.M.A.: Organization and Science Committee.
FEB. 25.—South Australian Branch, B.M.A.: Branch.
MAR. 16.—Tasmanian Branch, B.M.A.: Council.

Editorial Notices.

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